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THE IRON AGE

THE NATIONAL METALWORKING WEEKLY August 24, 1950

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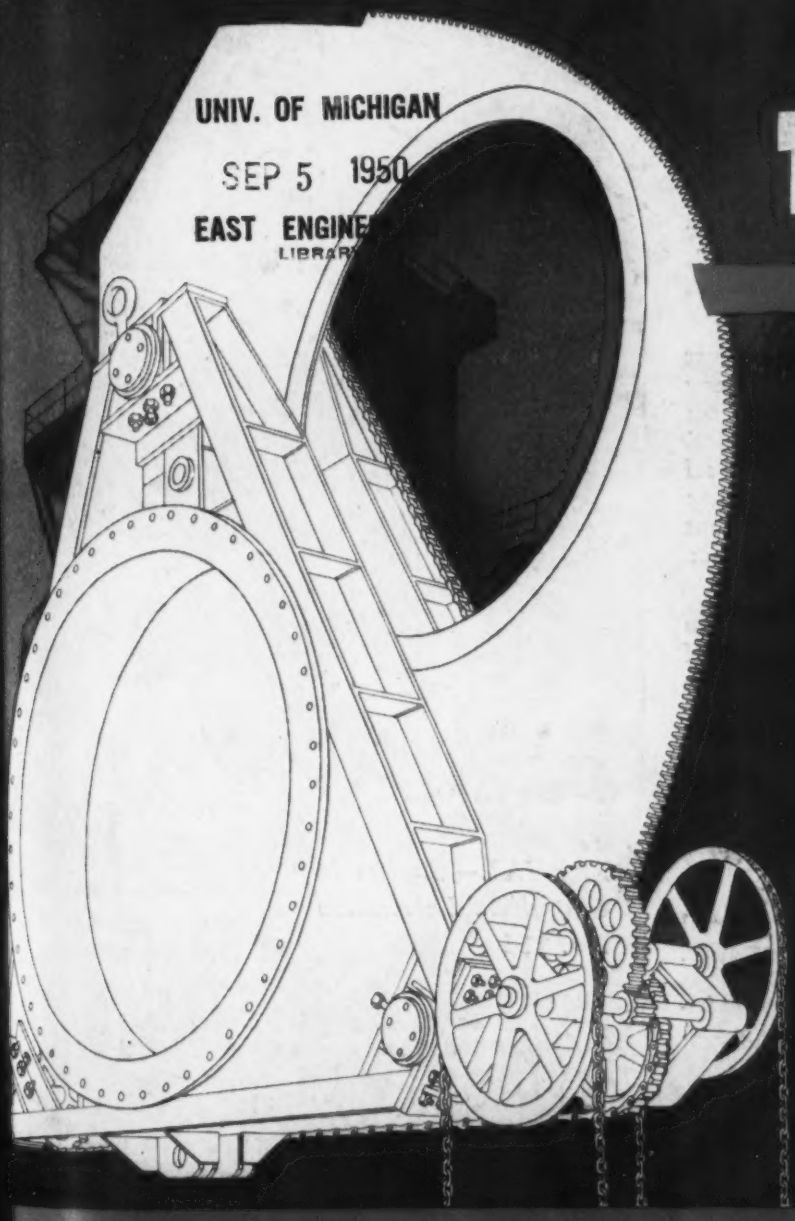

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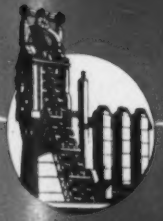

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# Farval provides perfect lubrication for world's largest tin dredges

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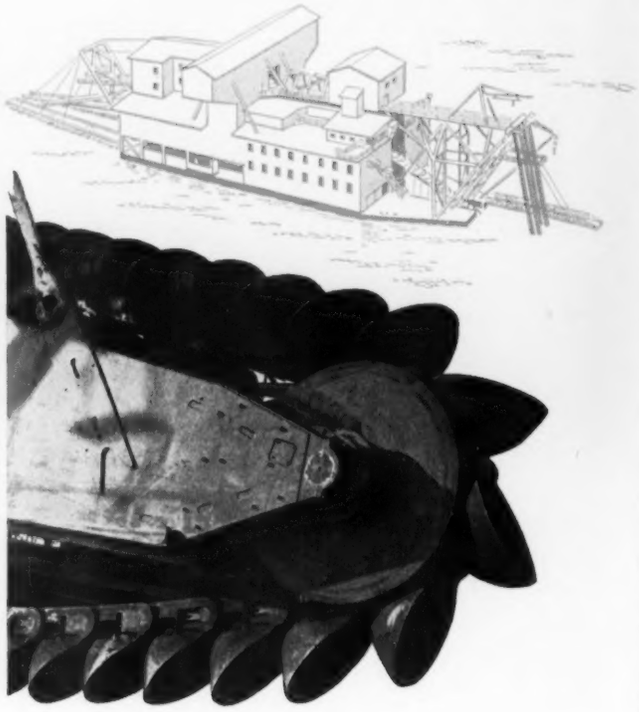
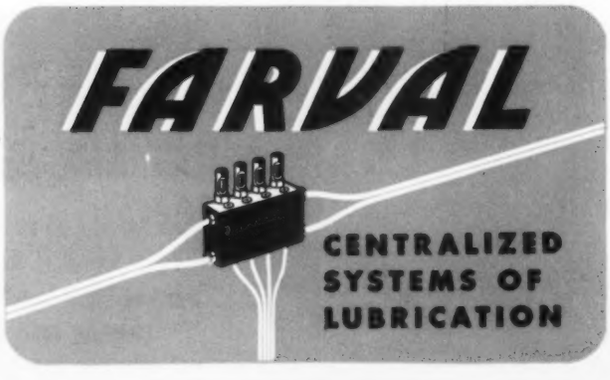
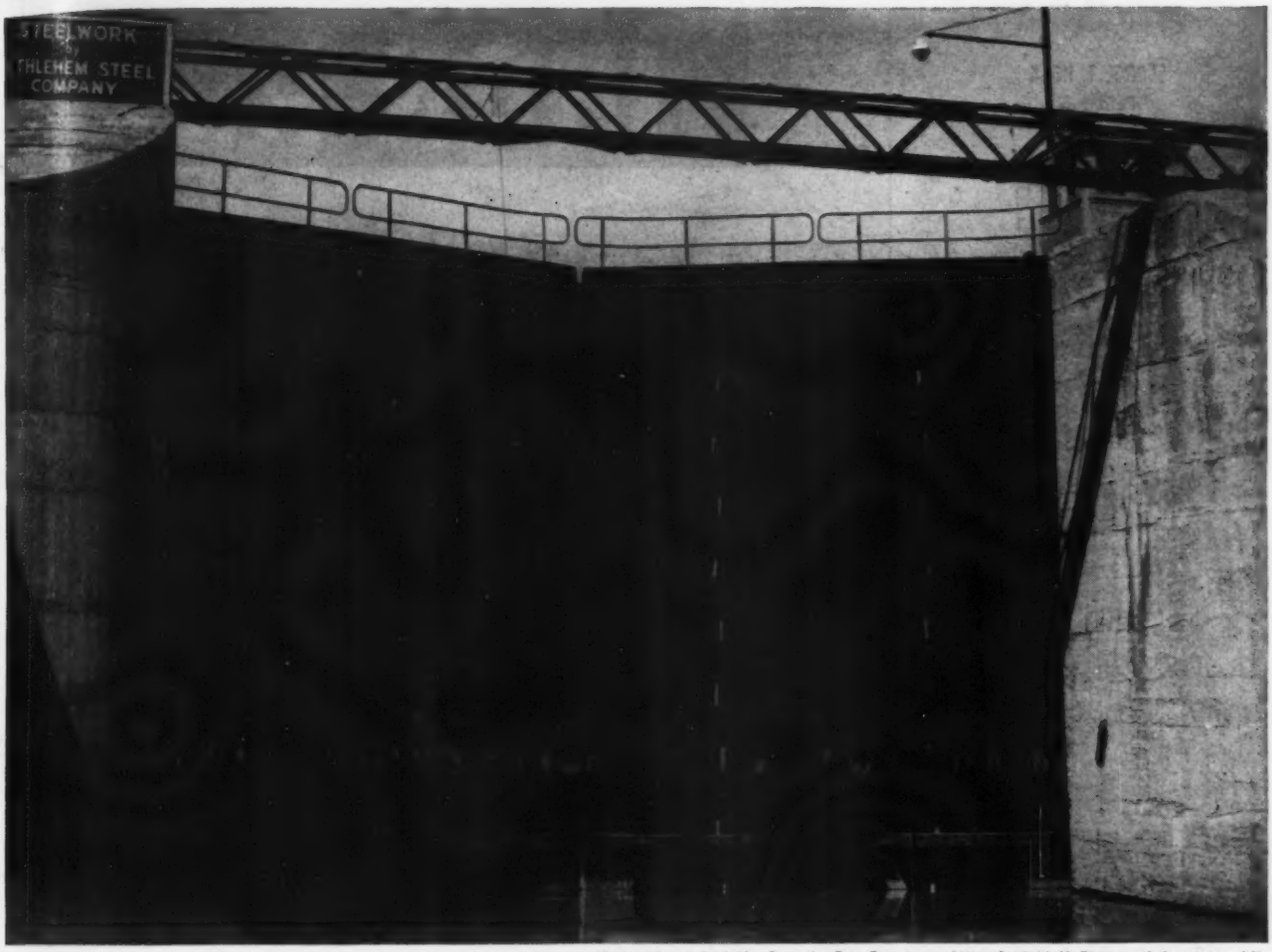


FARVAL—*Studies in Centralized Lubrication* No. 114






New gates at Lock No. 2 on the Erie Canal near Waterford, N. Y. These and the eight additional gates on Locks Nos. 3, 4, 5, and 6 were fabricated from Mayari R corrosion-resisting steel.

# New Lock Gates on Erie Canal Built of Mayari R

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# THE IRON AGE

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## Special Article

Two automatics at General Motors' Saginaw Steering Gear Div. not only turn bar stock into completely machined bearings, but harden them, too. Hardening is done by induction coil and quench arbors mounted on the tool slides. Time and equipment for processing are substantially reduced.—p. 65.

## Issue Highlights

Radioactive Cobalt 60 has proved versatile and easy to use for industrial radiography. Results are equivalent to those obtained with costlier radium, yet the cobalt isotope can be bought outright for less than 2 months' rental cost of the radium. Small shops can now have radiographic inspection with an outlay of only a few hundred dollars.—p. 68.

New Martin process gives aluminum a scratch and wear-resistant coating which is file hard, smooth, and heat refractive. Wear resistance is superior to that of hard chrome plating or cyanide case hardened steel. Cost may be less than chrome plating or heat treating steel.—p. 73.

It appears certain that provisions for accelerated plant amortization will be included in the interim tax-increase bill which is likely to be passed before Labor Day. This would permit industry to write off defense plants within 5 years, and is regarded as a boon to further industrial expansion.—p. 83.

Auto assembling in California is on the increase. About 10 pct of U. S. autos and light trucks will be assembled in the Los Angeles, San Francisco area in 1950. All companies assembling in the area are increasing their purchases of parts produced there.—p. 85.

Inventory control is one of the first steps expected from the President following passage of the control bill. While they aren't saying so publicly, this step will be welcomed by a good many sales executives who have been struggling to allocate their products fairly without making good customers sore.—p. 89.

## Coming Next Week

An Iron Age Special Report tells of a machine tool rental plan financed by an old-line commercial bank that marks a new approach to the machine tool replacement problem. Stymied by lack of tax credit for accelerated depreciation, many companies operate obsolete tools. This plan permits deducting the cost of new machinery as an expense before taxes. In most cases, it costs less to rent than to buy.


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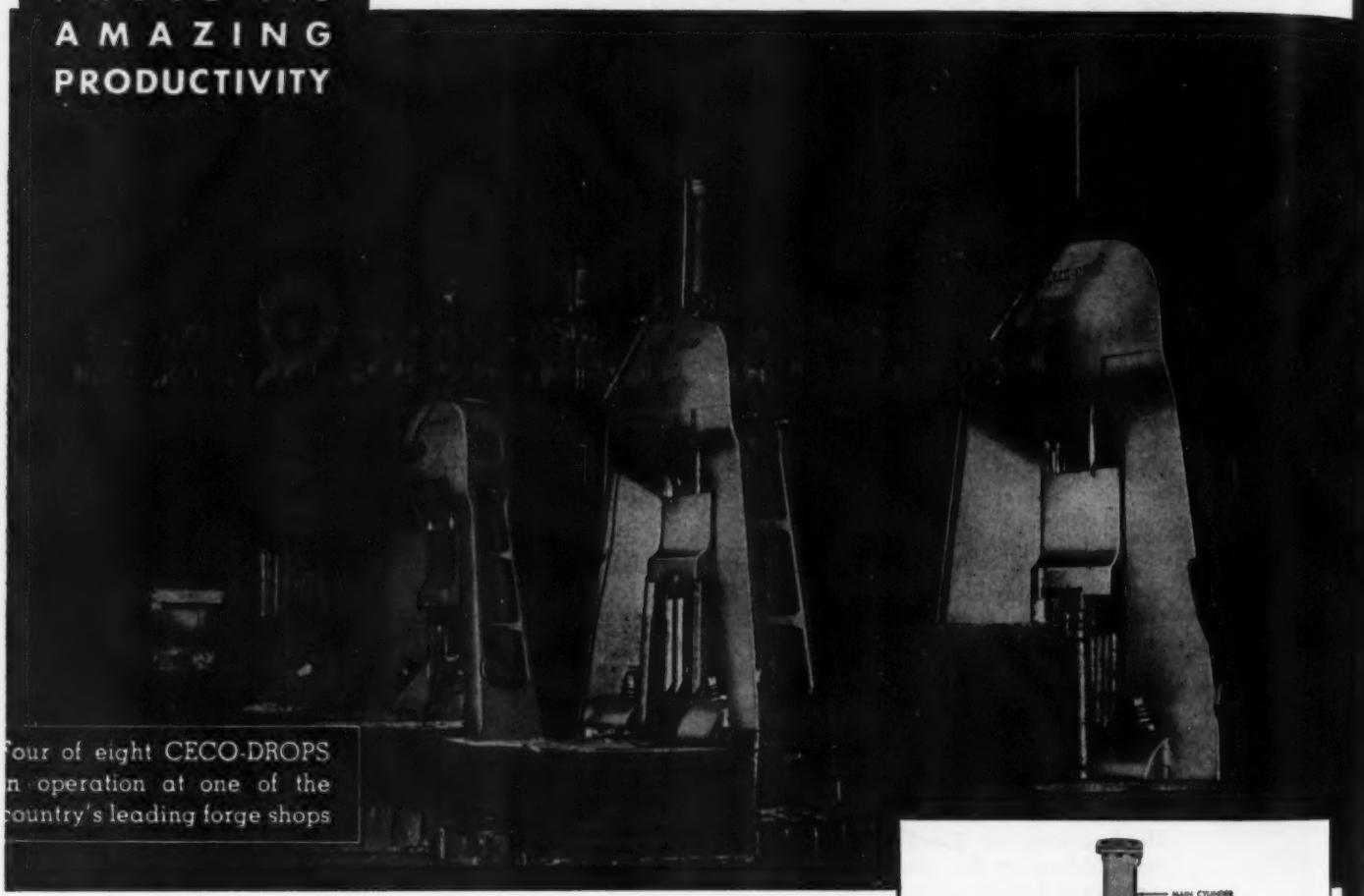

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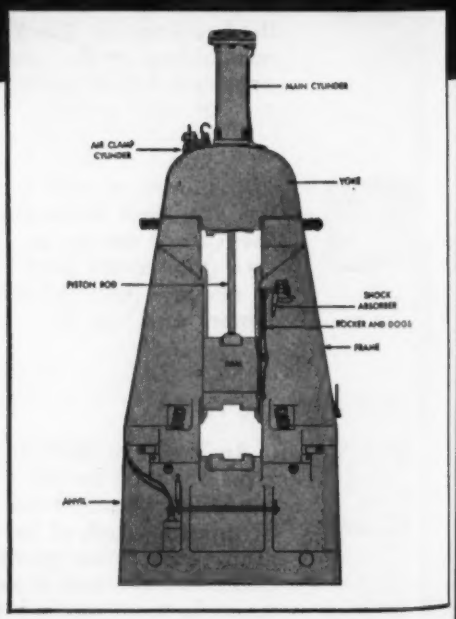


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# Editorial

INDUSTRY VIEWPOINTS

## We Need More Plain Talk

IF EVERY housewife went downtown and bought two or three boxes of pepper that she didn't need, we surely would have a pepper shortage. But would we? It all depends on how you look at it.

There was enough pepper for everyone before the stampede started. And there was still enough after the buying slowed up. But it was not distributed right. Those who did not buy could not get it because it was in the cupboard of those who bought.

There is no difference between pepper, steel, metals, machines and what have you when people think they are going to be left out. That's why people and industry have to use common sense in the present emergency.

But a rush for goods as is now going on has far more serious aspects to industry. Right now steel orders are way ahead of actual production. This is because everyone is trying to order all he wants or thinks he needs for many months.

Pretty soon some bright young fellow in Washington will start the ball rolling again that we have a steel shortage. Well, we don't. You just can't give everyone all he thinks he wants or needs right at the very minute he wants it—not when everyone else has the same idea.

*If you had twice the capacity in everything that we have now it would not take care of the stampede.* People who are ordering steel that they do not need now because they think they may not get it later will only make matters worse. Not only that, but in the last mile it will mean that the government will clamp on strict controls with all their lost motion and red tape.

The reason some people have gone on a buying spree is because they have had a lot of pap shoved at them to the tune that there is enough of everything for everybody—without plain-talk explanations.

For instance, we hear that only 10 or at most 15 pct of steel production will be needed for defense and war. That is right. There is enough steel to fight a full-fledged war with no trouble. But there is a thing called product mix.

It may only take 10 pct of total steel for this fracas, but it might take a much bigger bite of certain products. That's where the rub will come. And that is why people will have to take it easy and not go berserk when they order steel or other materials.

The months ahead will not be easy but they will be a whale of a lot easier if we have plain talk and use common sense. If we don't, we face just what we don't want—government bureaucracy and red tape. That we can't afford if we are to remain free and strong.

Tom C. Campbell

Editor

New!
MOTOR STARTERS

# 5 reasons why

## R. S. PYNE, THE VAN NORMAN COMPANY,

Mr. Pyne: *"The one thing my machine-tool customers want in a starter is durability. It's got to stay on the job year in and year out. And that, without a lot of expensive maintenance, too."*

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# NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► A way has been found to braze high temperature gas turbine alloys. The joint has physical properties as good as those of the base metal and is strong enough to stand service at 2000°F.

► Freight car building is gathering headway very slowly. Output for this year is not likely to top 50,000 cars and the 10,000-car a month goal probably will not be reached before next March.

Principal reason is that most car shops were down flat for months and have spent the past few months rebuilding their working forces and refurbishing equipment.

► A Chicago firm recently saved 3 tons in overall weight of a motor grader by use of aluminum. The new machine can be moved by airplane. Ballast boxes permit loading it to do any job that a standard model will do.

► Breakage of equipment in shipment and in warehouse handling was a serious problem during the last war. This explains the armed forces current interest in palletizing shipments. It has been suggested that it would be cheaper to use expendable steel pallets than to ship unpalletized.

► Anodized aluminum ice cube trays in color are slated to appear in some refrigerators next year. To date, three satisfactory colors have been perfected: Black, red and yellow. Sales appeal is one angle; another is to produce a surface that is less likely to rub off and oxidize.

► The Navy has developed a hydraulic device as a partial substitute for a supersonic wind tunnel. The table-top machine uses relatively small hydraulic pumps instead of huge propellers. Though it cannot be used for final studies it does permit rough mathematical calculations.

► Reports that Russia is trying to buy manganese in other countries have led to speculation that Soviet mines may be petering out. Experts doubt this—suspect that Russian buying is to limit the supply available to the U. S. Mexico has refused export permits to Russian destinations, even on low grade ores.

► New model plans of the auto industry are moving with some signs of hesitation. A restyled Lincoln, in October, will follow Packard's new model. Dodge and Plymouth are reported to be nearly ready but they are still working off 1950 model parts. GM introductions are slated for the fourth quarter. These are the plans but the war could change them.

► A new industrial metal sponge made of a continuous ribbon of curled Monel has been introduced by a Midwestern manufacturer. Because it is corrosion resistant and easily cleaned it is aimed at jobs where contamination by harmful metal particles must be avoided.

► CIO strategy for the next round is pretty well mapped out—barring a complete wage-pension-insurance freeze. The union will train its guns on unemployment insurance just as social security and pensions were the targets of the last round. Idea is that if industry had to pay more unemployment compensation the union would have an ally in the drive to widen government unemployment benefits.

► A small manual oil changer for automotive and marine use is said to change oil in 2 min. It uses a steel suction tube through the dip stick hole to do away with the need for removing the oil pan plug.

# Kimpak* Float Packaging

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Perfection Stove Company

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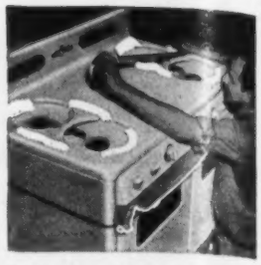

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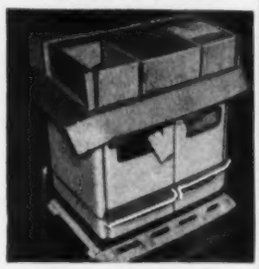

**3.** "Egg crate" is now added. KIMPAK separates and cushions accessories in compartments.

**4.** Shipping container now completes the package, and range is protected against transportation hazards.

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War to Drain Civilian Steel

Defense Orders Shaping Up

Scrap Market at New Peak

# The Iron Age SUMMARY

## IRON AND STEEL INDUSTRY TRENDS

THE war's impact on "civilian" steel is going to be terrific before this year ends. Plates and sheets will be hit hard. By next year when programs now in the planning or talking stage are rolling, as much as a third of all flat-rolled steel production will be earmarked for war (hot and cold) and essential civilian use.

Until now it has been possible to estimate only the total ingot tonnage which will be required by the war effort at its present stage of planning. But some war orders are now being placed and the pattern of product-mix (proportion of various steel items) is beginning to shape up. Direct military orders now include landing craft, tanks, some additional trucks, aircraft landing mats, blitz cans, field ranges, lockers, etc.—all heavy on flat-rolled steel.

A sharp increase in oil pipe line building is in the cards and freight car production is gathering steam; soon it will take a quarter of a million tons of steel (mostly plates and structural shapes) every month. Over 20,000 grain bins, costing $20 million, and requiring aluminum and galvanized steel sheets were ordered for 45-day delivery. Several orders for lockers are now being pushed hard by the military, which is also pressing for accessories like draftsmen's stools.

### Pressure Grows for Flat-Rolled

The picture is one of mounting pressure for flat-rolled steel, with some emphasis on tubing (both hot-rolled and cold-finished) for rockets and similar weapons. It is true that total defense and essential civilian requirements will probably take only 15 pct of next year's steel production—on a tonnage basis. (This does not include expansion in pipeline construction which could boost the total considerably.) But the way steel users will be affected will not be in any 15 pct proportion when these programs really get rolling.

But the hitch comes in product-mix. Essential program will require more than 15 pct of sheets, strip and plate, and they will need less of some other items. Plainly, the essential programs will require a proportionately larger share of some of the steel products which are already in shortest supply.

To some extent steel producers can alter their product-mix to make more of some items and less of others. But this is limited by the flexibility of the company's finishing facilities. It also requires changes in production planning and scheduling all the way down the line.

### Plate Production Saps Sheet Output

Here's how it works: Heavy tonnages of plates are needed for the freight car program. One producer is rolling plates for the car builders on a continuous sheet mill. Others are allocating greater tonnages of semi-finished steel to their plate mills. This means that much less semi-finished steel can be turned into sheets and strip. The car builders, busy rebuilding inventories and recruiting manpower, probably won't be in high gear before early next year. Meanwhile, steel producers are coming through with enough steel to meet current requirements.

Conversion business is booming, but running into bottlenecks. It's becoming more and more difficult to obtain space on rolling mills. But the chief fly in the ointment is the blooming-slabbing mill. The purchasing agent's cry of joy over obtaining a supply of ingots turns to anguish when he can't find anyone to break them down for him.

### Scrap Market Still Rambunctious

Because of a rail strike in some key points steelmaking operations this week are scheduled at only 91 pct of rated capacity, a decrease of 9.5 pct from last week. In addition to the steelmaking loss, some shipments of finished steel products were being held up. Wherever possible, plans are being made to move this tonnage by truck.

The scrap market is still on a rampage. Price increases this week boosted THE IRON AGE steel scrap composite price to a new high for the year.

*(Nonferrous summary, p. 108)*

# VEGA

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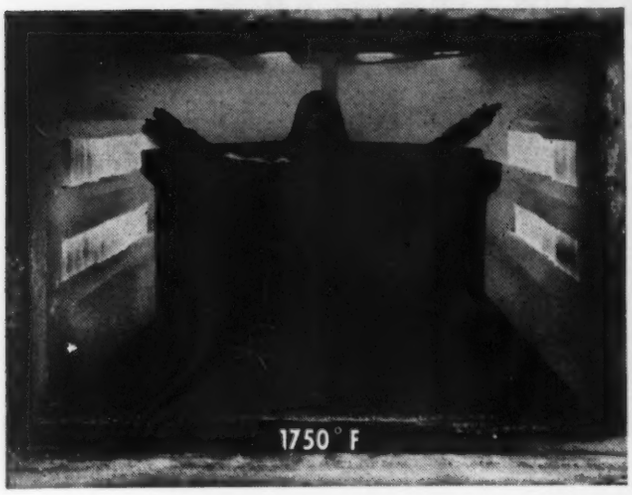

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- **High Degree of Toughness with Good Hardness to Resist Shock and Wear.**

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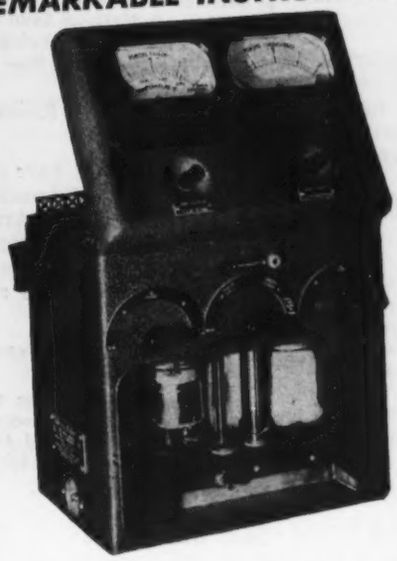

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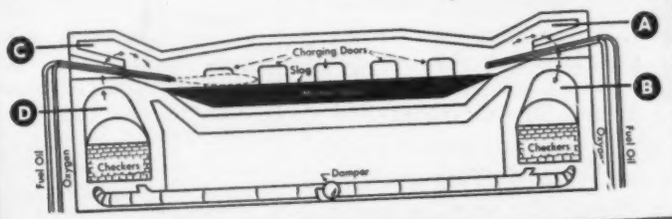


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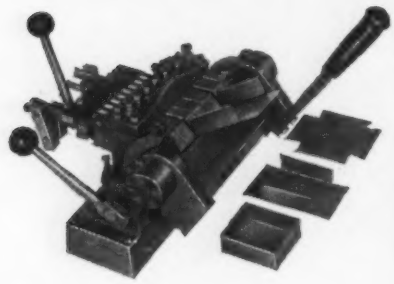
BOX FINGER BRAKE

Four models 6" 12" 18" 24"
Capacity—16 Gauge Steel



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2 STANDARD BRAKE
3 BAR FOLDER

One box or 10,000—can be economically produced with the versatile new Di-Acro Box Finger Brake.

Serves perfectly for all standard brake operations — an Acute Angle Bar converts the brake to a bar folder for licks, seams, hems and sharp angles.

The unique Di-Acro Open End Finger forms square or triangular tubes and other similar parts. The Box Finger Bar can be easily mounted on all standard Di-Acro Brakes.

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# Dear Editor

*Letters from Readers*

## Shades of Ponce de Leon

Sir:

I'm 43, and I was just wondering if you could obtain for me the secret of eternal youth, as practiced by the late Mr. Cochran? My very sincere thanks, in advance, for this information.

*R. T. LYMAN*
*Advertising & Sales Promotion Mgr.*
*Torrington Mfg. Co.*
*Torrington, Conn.*

Reader Lyman is referring to an obituary in the Aug. 10 issue, which stated:

"Clyde E. Cochran, 44, an engineer with the Elwell-Parker Electric Co., Cleveland, passed away recently at Twinsburg, Ohio, where he was born 72 years ago."

We are all seeking the same secret, and promise to give it proper editorial attention in THE IRON AGE when we discover it.—Ed.

## Propaganda Editorial

Sir:

I, as no doubt many thousand others have already done, want to compliment you on the editorial, "Now is the Time," in the Aug. 10 edition of THE IRON AGE.

*W. B. WILKINS*
*President*
*American Manganese Bronze Co.*
*Pittsburgh*

Sir:

We have read your excellent editorial "Now is the Time," in the Aug. 10 issue. We would appreciate it if you would arrange to send us 30 copies of this editorial for use here in our plant. We will be glad to cover any expense in connection with this.

*C. S. WEBER*
*Advertising Mgr.*
*Thew Shovel Co.*
*Lorain, Ohio*

## Canadian Titanium

Sir:

Your very interesting article, "Alloys Widen Use of Titanium," in the issue of July 27 deals with titanium alloys and developments. I am writing to ask for guidance in the matter of siliceous titaniferous magnetite deposits in Alberta. This ore runs from 14.7 to 54.88 pct metallic iron, 4.84 to 45.20 pct silica, and 4.62 to 12.02 pct titanium oxide. Although we have had quite considerable experience in the pilot reduction of ordinary magnetite, we are somewhat in the dark about the titaniferous variety.

Have you any information on the reduction of this kind of ore, and is it likely to be of any value because of its titanium content? It would be greatly appreciated if you could direct us to people who may have had experience in a suitable reduction process.

*J. W. DAY*
*University of British Columbia*
*Vancouver, B. C., Canada*

The ore described would probably be of little interest to the titanium producers because of its low oxide content. A good deal of ore with approximately the same analysis is found in this country. The best source of information on reduction methods for this type of ore is National Lead Co. The address of the Manufacturing Operations Dept. is 111 Broadway, New York.—Ed.

## Always a Handy Reference

Sir:

Some time ago, I have seen in THE IRON AGE some information concerning the plant built by Armco and A. O. Smith to make large diameter welded pipe. Would you be kind enough to give me the reference of this article?

*E. SPIRE*
*Consulting Engineer*
*Montreal, Canada*

Articles on the plant for making large diameter welded pipe appeared in the following issues of THE IRON AGE: Aug. 11, 1949, p. 111; Sept. 29, 1949, p. 86; and Mar. 23, 1950, p. 81.—Ed.

## Thin Ductile Fe

Sir:

Your article entitled "Ductile Iron —In Light Sections," in the Aug. 10 issue, will be of great interest to many foundries producing small gray iron castings. I would like to get three reprints to send to foundries in Switzerland as quickly as possible. The one in my Aug. 10 issue was airmailed to the director of the Textile Loom Foundry at Zurich.

*P. F. NYDEGGER*
*Westfield, N. J.*

## Printing on Steel

Sir:

In R. T. Reinhart's West Coast Progress Report of the June 15 issue, the paragraph headed Printing on Steel describes a new process of identification marks on steel and on other metals. You mentioned that this process was developed by Bell Press, Los Angeles. We would appreciate it if you would give us the correct mailing address of this company, as we are interested in contacting them regarding the possibility of applying this process to an identification problem.

*C. G. POEHLMANN*
*Quality Mgr., Jet Propulsion Div.*
*Thompson Products, Inc.*
*Cleveland*

The address of Bell Press is 1624 East First St., Los Angeles.—Ed.

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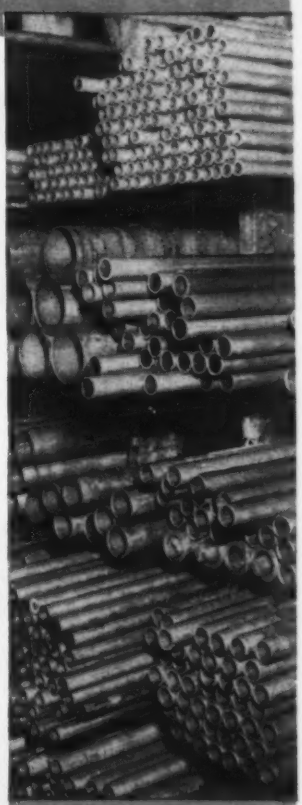
MORE SIGNIFICANT FACTS ABOUT

# YODER Electric-Weld Tube Mills



Going back only ten years, Yoder has built and sold over 140 pipe and tube mills. 20 manufacturers now operate a total of 78 Yoder Tube Mills—an average of nearly four each!

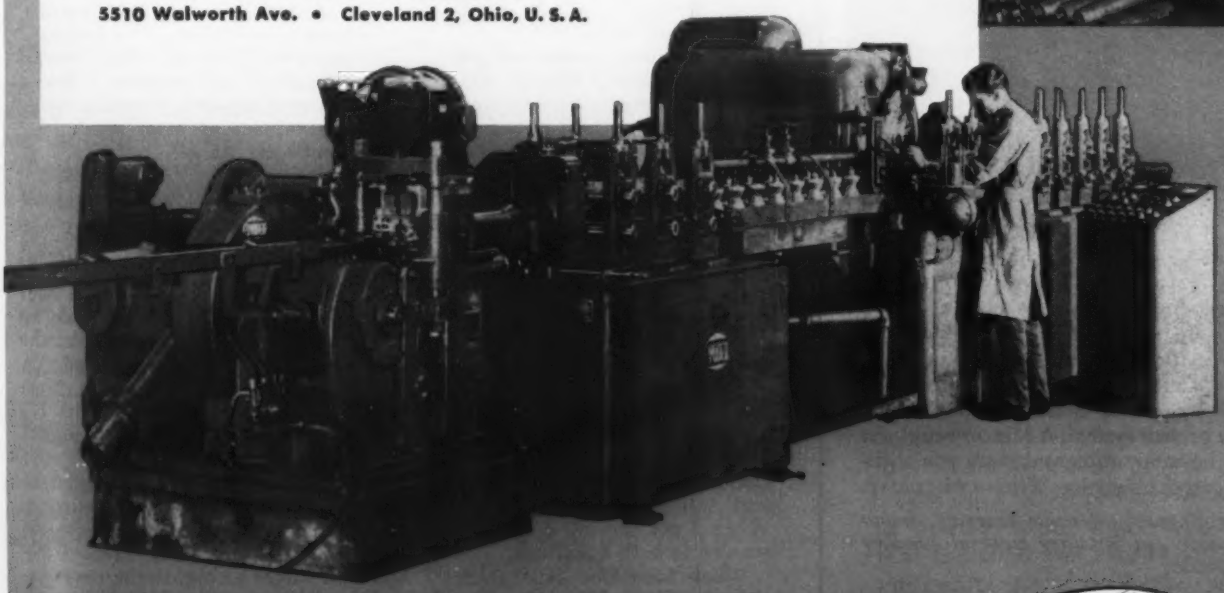
Many of these operators started with only one Yoder, adding the others from time to time to meet increased requirements.

Before buying their first Yoder, some of these manufacturers already had an electric-weld mill of another make. In many cases, the latter has since been used merely as a standby. In other cases, they have replaced the old welder with a Yoder, resulting in increased production, stronger welds, and greatly reduced welder maintenance.

Moderate first cost of Yoder mills; consistently high production of the highest quality tubing; and negligible scrap losses,—are some of the reasons for the worldwide preference for Yoder mills, not only by commercial makers, but by manufacturers desiring to make tubing exclusively for their own use. Sizes range from ¼" up to 36" diameter.

76-Page illustrated book on electric-weld tube making answers questions most frequently asked by prospective purchasers of pipe and tube mills. It's yours for the asking.

**THE YODER COMPANY**
**5510 Walworth Ave. • Cleveland 2, Ohio, U. S. A.**



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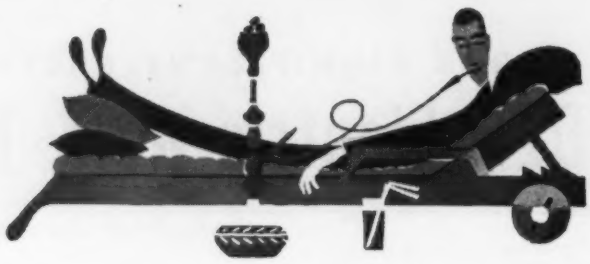


# *Fatigue Cracks*

By CHARLES T. POST

## Steel Shortage

Literary inspiration is a funny thing. Some writers commune with nature to strike the spark. Others start pounding the typewriter when they see a beautiful woman or become enmeshed in the strands of emotion. With Clem Caditz, president of Northern Metal Products Co., Chicago, it takes a steel shortage. Apparently the editors are right, as usual, in commenting on steel scarcity, for we have a letter from Clem after a long lapse:

"Dear Charlie:

I've suddenly realized that the worst thing about this steel shortage is not the shortage of steel at all.

What finally made me see this point clearly was an incident at the corner delicatessen. I asked for a half-pound of Kosher corned beef. The clerk has his hands on the slicer, looks up and asks, 'What gage, mister?'

You see, Charlie, everybody is in the steel business. I go to the dentist. It's not that I want to, but my tooth aches. Now, Doc used to talk—while he was probing and drilling—of his luck at the races, his apartment houses, and his stock market experiences. I couldn't ever afford any of that, and I'd always sit there and wonder how Doc could. When I got the bill I had the answer to both questions.

What does Doc talk about today? 'Say, Clem, can you use 500 ton of 16 ga cold-rolled steel at 200 bucks a ton? I've got a patient who . . .'

Now, I've got a brother-in-law (you've probably got one like that, too) whose opinion I don't take about the picture at the corner movie. Normally, his conversation is about two men — the managers of the Cubs and the Sox. Now, I sit there and choke. 'Say, Clem, I've got a deal for 1600 ton of 24 ga. It's F.O.B. Dallas . . .'

When you and I were kids, Charlie, do you remember how they told us of the educational advantages of saving stamps? You learned geography. Today, all you have to do is use steel. I've followed up offers of Japanese steel, German steel, Belgian steel, English steel, Canadian steel and French steel. There's a letter on my desk from the Union of South Africa. I'm afraid to open it. What process could they be using down there?

Today, anyhow, I'm going to have some relief. I'm having lunch with the salesman from our steel mill source. You can rest assured, Charlie, that the subject of steel won't be mentioned at all.

Sincerely,
CLEM."

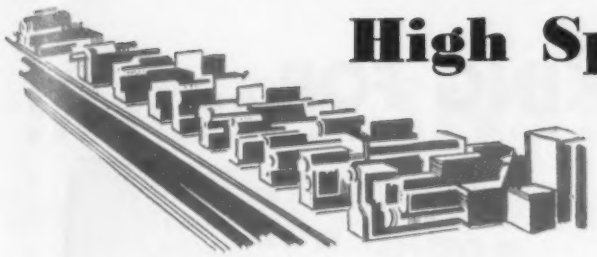
## Puzzlers

After worrying about that double ladder problem last week we were ripe for Bob Hatschek, the assistant ed, when he asked, "A driver and a helper ride a 2-ton ice truck. The driver weighs 175 lb. What does the helper weigh?" Ans. "Ice."

Last week's alley was approximately 52.07 ft wide according to A. C. Wilcox, one of the perpetrators, who comments, "This problem involves an eighth-degree equation with truly formidable coefficients, but by a simple transformation it can be reduced to a fourth-degree equation with manageable magnitudes." If you're interested we'll send his work sheet.

E. J. Sampson wants to know, "What volume of material would be removed from a 2-in. diameter bar if drilled perpendicularly to its center line and through its center with a 2-in. diameter drill?"

# MACHINE TOOL High Spots



*Sales Inquiries and Production*

By W. A. LLOYD

**Quick Pace Continues**—Despite a nominal decline in demand for certain types of equipment, the machine tool industry this week continued to maintain substantially the accelerated tempo of the past 2 months.

Primary problem of the moment is obtaining additional manpower for increased output. Most shops are loaded with orders. What is feared is that defense and MAP requirements may develop before the industry gets on top of present backlogs, and perhaps put the industry unfairly in the position of appearing to be a bottleneck to the bureaucrats.

**Carmakers' Avalanche** — In Detroit, there are as yet no indications that rearmament is going to crowd out a big volume of tooling for automotive purposes. The avalanche of tooling orders is continuing.

Chrysler and Ford are crowding machine tool builders for deliveries. Already a tight skilled labor situation has developed for which there is no solution in sight.

**New Code**—A code of ethics for the gray iron castings industry is being distributed by Gray Iron Founders' Society. The code, developed by a committee of foundry management executives, lists provisions constituting fair trade practices for nearly all commercial situations involving suppliers, customers and competitors. Copies can be obtained by writing to Gray Iron Founders' Society.

**Buick Engine**—The Detroit transmission division program is moving ahead. Placements of the new Buick high compression engine are anticipated in the very near future.

A check of local tooling sources reveals only a few orders that can be definitely identified as Ordnance.

More than 600 suppliers have been alerted to the requirements for Cadillac Motor Car Div.'s Cleveland tank plant where all major operations on the hull and turret and complete assembly of the vehicles will be performed. Much of the work on the layout for the machining and assembly departments has already been completed.

**New Plane Engine**—A considerable number of placements are expected if the armed forces decide to place contracts with at least one, and possibly two, major aircraft engine producers for a new type engine. Plants are presently tooled for an older type.

This decision will be made within the next 2 or 3 weeks, it is understood. The new engine program will require a material increase in the production of aircraft instruments.

**Women Workers Back** — These developments indicate that the industry must move very fast on its manpower problems. In Cleveland, Warner & Swasey Co. put to work the first elements of what is expected to be a working force of 150 women this week.

Shortage of skilled manpower is present in industries closely allied to machine tools, particularly the contract tool and die shops.

**Sharp Sales Spurt** — National Tool & Die Manufacturers' Assn. reports sharp increases in sales invoiced, backlogs for the first 6 months of this year compared to the corresponding period of 1949. First half business this year registered an 8 pct increase over the first 6 months of last year, with June '50, business 139 pct of June, 1949, volume, and 120 pct of May, 1950. In fact, June volume of sales invoiced was the highest in the contract tool and die industry since March, 1947 and June orders were the highest since January, 1949.

**Sun is Shining**—Outlook for the contract tool and die industry is the brightest it has been for a long time. Employment has been increasing in the average shop since June, 1949. Some defense orders have been received, but it is expected that a big military tooling program would mean a drop in civilian business because companies would be unable to get steel.

The June upsurge was the result of a decision by many companies that the time was ripe to get tooling and to get it while they could.

In Hartford, Conn., sales of the machine tool business of Taylor & Fenn Co. to an undisclosed purchaser has been reported. Taylor & Fenn, one of the oldest companies in the machine tool industry, produced milling and drilling machines in addition to other types of equipment.

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CHASE is at your service to supply you with a great variety of free-cutting brass and bronze alloys in round, hexagonal, and octagonal rod; square or rectangular bar, and many shapes.

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In Chase free-cutting brass rod about 9,000,000 lead particles are removed in one revolution of a ¼" drill! Each particle contributes to the ease of machining that results in longer tool life!

**Why you should specify CHASE!**

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**4.** Because Chase is the nation's headquarters for brass and copper, you can do "one-stop" shopping. Many items needed for assembly work or maintenance, such as bearing bronze and rivets, can be supplied... in addition to raw materials needed for production.

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# SHORT INSTALLMENTS

## *How "Dual Metal" Made a Better Flour Mill Roll*

Four years ago, Allis-Chalmers, one of the leading manufacturers of milling machinery asked us to develop a centrifugally cast flour mill roll . . . a more efficient roll that would lower maintenance costs, provide for better control of the grinding operation, permit increased production. Working with Allis-Chalmers engineers, centrifugally cast dual metal grinding rolls were developed and put into production.

This is one of many diverse applications for dual metal centrifugally cast products serving a wide cross-section of industry.

Certainly dual metal centrifugal casting, like any other process development, is not an industrial panacea. Nevertheless, this process has economic and mechanical advantages challenging the attention of the design engineer. Many cylindrically shaped products can be made, which combine into one integral structure, properties that no single metal can offer. This Allis-Chalmers' application may suggest ways in which you can profitably apply "Dual Metal". Our engineers will be glad to consider your individual problems.

**OTHER "DUAL METAL" APPLICATIONS**

1. Gray or alloy iron inside steel for railway Diesel engine cylinder liners—thus combining the strength and weldability of steel with the wearing properties of iron.

2. Gray iron or Ni-Resist inside chilled iron, tool steel or Ni-Hard—for paint, soap, ink, chocolate, cereal, paper, textile and metal-working rolls. These combinations provide a hard wearing surface on the outside and a soft, machinable gray iron core.

3. Gray iron inside stainless steel—for paper, textile and food processing rolls—to obtain corrosion resistance economically in heavy wall sections.

**SINGLE METAL CYLINDRICAL CASTINGS**

Carbon, alloy and stainless steels; gray and alloy irons including Ni-Hard, Ni-Resist and special chemical piping.

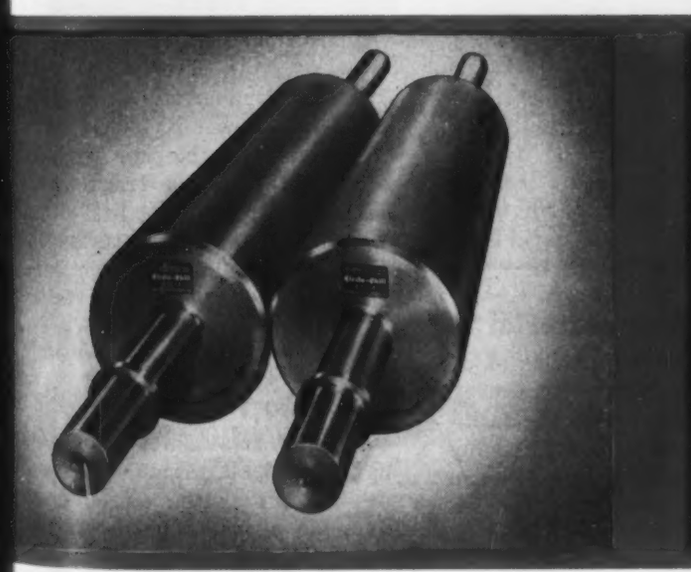
**SIZE RANGE**

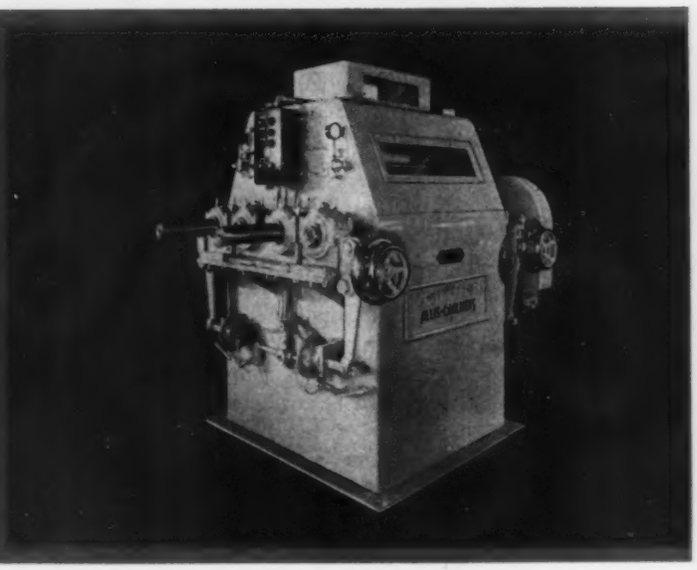
Outside Diameters—4" through 30". Wall thickness—½" up. Lengths—Up to 10'.

**U. S. PIPE AND FOUNDRY CO.**

**SPECIAL PRODUCTS DIVISION, BURLINGTON, NEW JERSEY**

AMERICA'S LARGEST PRODUCER OF CENTRIFUGALLY CAST FERROUS METAL PRODUCTS IN TUBULAR FORM





**2** **BETTER END PRODUCT**—These "Circle-Chill"* rolls, as Allis-Chalmers identifies them after finishing, consist of a hard chilled iron outer shell of iron carbide and pearlite *metallurgically bonded* to a gray iron core. The iron carbide resists wear, the pearlite strengthens the structure, forming a matrix for the iron carbide. The soft iron core facilitates machining and fabricating. The complete bond between the chilled and gray iron, a characteristic of dual metal centrifugal casting, is effected by close control of metal temperatures and timing during casting.

**3** **BEST RESULTS IN SERVICE**—Allis-Chalmers' specifications require semi-finished rolls of consistent and controlled chill depth, uniform hardness (in both the chilled iron outer shell and the soft gray iron core)—qualities that insure easy and satisfactory corrugating and long trouble-free service. Allis-Chalmers finishes these rolls with meticulous precision for the efficient, economical flour mills shown above. One more proof that cooperation in industry pays . . . and that two companies each contributing its specialty usually can produce a superior product.

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# PUBLICATIONS

**New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.**

## Core and Mold Ovens

Advantages of Coleman core and mold ovens that give greatest production at lowest possible cost are detailed in a new 6-p. folder. Representative of the more than 9000 successful installations, photos are presented to show various types of ovens in current use by cost-conscious foundries. *Foundry Equipment Co.*

**For free copy insert No. 1 on postcard.**

## Mechanized Pouring

A case study report on nonferrous and ferrous metal pouring, in hot weather, is the context of a new 4-p. folder. Pictorially, the metal is shown as it is poured from the furnace and conveyed in type FA pouring machines on a monorail to the pouring floor crane. The folder tells how mechanized metal pouring will result in improved working conditions and higher output with reduced scrappage. *Modern Equipment Co.*

**For free copy insert No. 2 on postcard.**

## Tube Working Handbook

The latest edition of a reference handbook on methods of working seamless tubes and pipe of the ferritic air-hardening intermediate (0.5 to 9 pct Cr) B&W Croloys incorporates new data accumulated since 1946, the date of the previous issue. This new pocket-size book, intended to simplify fabrication of these tubing steels, presents the latest practical data and instructions for obtaining maximum benefits from their use. Information presented includes composition, general characteristics, annealing practice, methods of cold and hot working, welding, condensed technical data and general reference tables. The handbook has been broadened to include two relatively new but popular alloy tubing steels for high-temperature service. *Babcock & Wilcox Tube Co.*

**For free copy insert No. 3 on postcard.**

## For Sheet & Strip Mills

The Voss-United leveler, a master leveler designed for use on any metal that can be rolled, is described in a new 16-p. bulletin. Profusely illustrated with photos showing various installations, the booklet presents design features of the equipment, pointing out that no other leveler has the individual back-up roller (patented) for all supporting rolls, to assure that the material levels flat. *Voss Engineering Co.*

**For free copy insert No. 4 on postcard.**

## Important Raw Material

Industrial water problems of all kinds—procurement, treatment, usage and disposal—and the facilities and services offered in coping with them are described and charted in a new 12-p. booklet. Pointing up the importance of water in all kinds of industries and industrial operations is a front-cover illustration diagramming the amount of water needed to produce a ton of each of several types of products. *Hall Laboratories, Inc.*

**For free copy insert No. 5 on postcard.**

## Separation Screens

Patterson Gyrocentric screens for wet and dry separation of chemicals, plastic powders, crushed rock, abrasives, adhesives, refractories, paint, enamel slip and frit, for de-watering and liquid recovery processes and other types of production separation operations are described in a new 24-p. illustrated brochure. *Patterson Foundry & Machine Co.*

**For free copy insert No. 6 on postcard.**

## Industrial Truck

Dimensional and other specifications for the Transporter 101 driver-led industrial truck are shown in a new 6-p. folder. This latest version of the popular power pallet and platform truck incorporates electric or foot lift with a number of other features described and illustrated in the folder. *Automatic Transportation Co. Div. of Yale & Towne Mfg. Co.*

**For free copy insert No. 7 on postcard.**

## Specs Correlated

A new data sheet correlates ASTM, Federal, Army and Navy specifications with 40 different Riverside alloys. The sheet indicates to the designer, specification engineer and purchasing agent which alloy to specify. Alloys listed include (1) phosphor bronze plate, sheet, strip, bridge plate, rod, bar, wire and shapes; (2) copper-

*Turn to Page 100*

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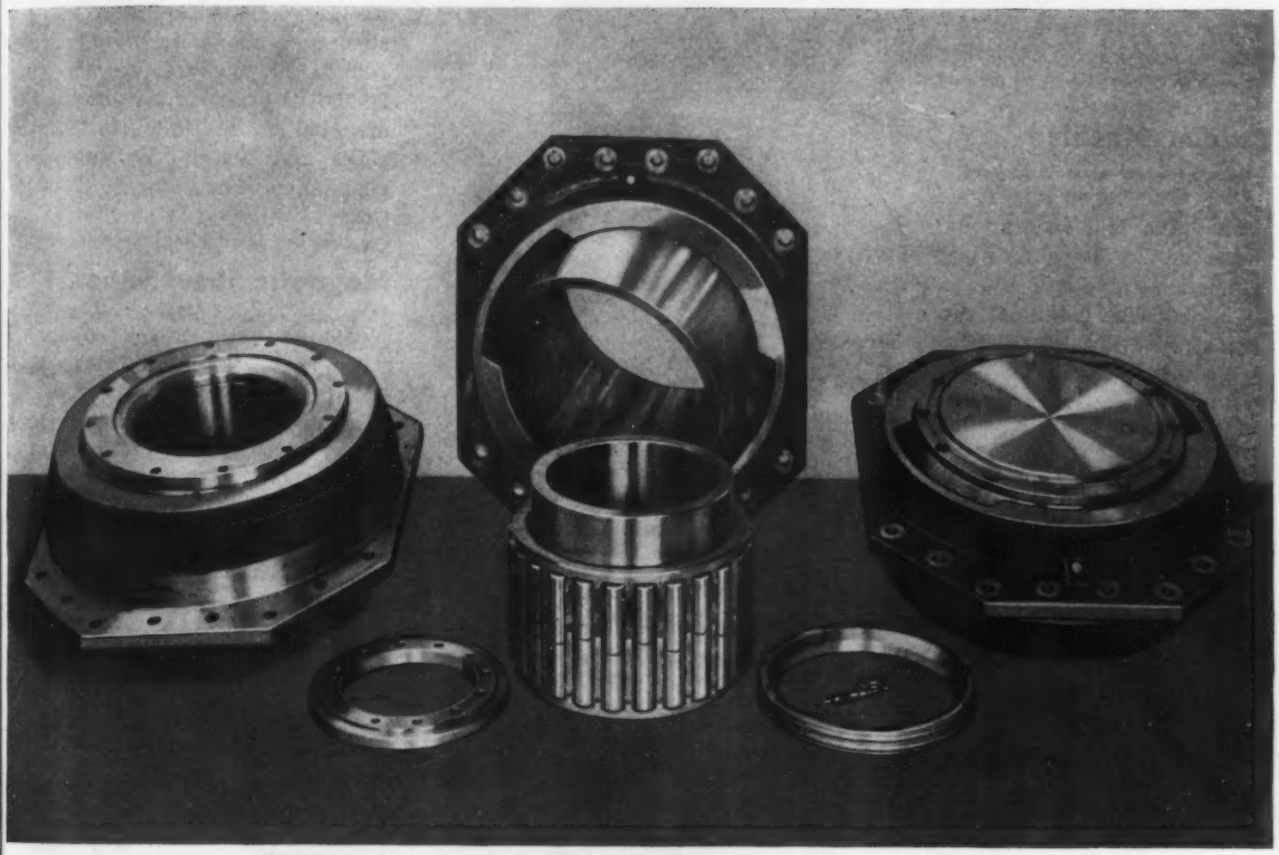
# Big, Busy, Bascule Bridge

## at Two Rivers, Wisconsin

## designed to pull smoothly on KAYDON bearings



KAYDON RADIAL ROLLER BEARINGS 12.000" x 22.000" x 10.750", with housings

Engineers who designed the new bascule bridge at Two Rivers, Wisconsin, found **KAYDON** well prepared to meet their demands for four big, husky, compact, radial bearings, with housings, as shown here.

**KAYDON** specializes in bearings designed for specific duties . . . and **KAYDON** has *all* the facilities for producing them. Whatever your bearing problem may be . . . whether it involves a few specially designed, heavy-duty bearings 4" to 120" outside diameter, or millions of high precision needle rollers . . . contact **KAYDON** of Muskegon for dependable counsel, in confidence.

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**ALSO INVESTIGATE NEW KAYDON TECHNIQUES** for hardening raceways only, thus permitting the races themselves to be drilled, tapped, and in some cases, gear cut. Better bearing efficiency in restricted space is assured . . . surrounding parts can be eliminated . . . important weight-reduction is accomplished.

**KAYDON** Types of Standard or Special Bearings: Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

• ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER •

# NEW PRODUCTION IDEAS

*Continued*

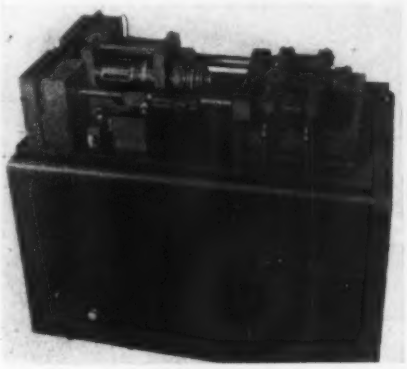
in. in steel; spindle run-out 0.005 in.; spindle square to table within 0.0075 in. in 5 in. A vertical mounting 1/3 or ½ hp, 1725 rpm motor may be used to power the drill presses, providing four spindle speeds ranging from 740 to 4070 rpm. *South Bend Lathe Works.*

For more data insert No. 20 on postcard, p. 35.

## Beading Machine

**Beads tubing after it is bent, using the spinning principle.**

The tube is held stationary by blocks in the die while the profile spindle is rotated off center to form the bead. The height of the bead is controlled by the distance the profile spindle is rotated off center.



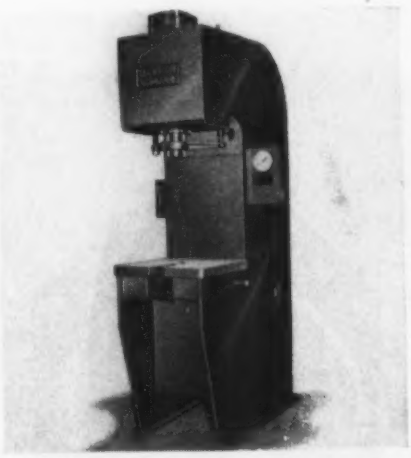
A limit switch adjustment controls this distance. The profile spindle has ½ in. throw off center, and a one shot oiling system. Two electric motors, 7½ and 10 hp, power the unit. Time cycle with a potential of 1200 cycles per hr is adjustable by a flow control valve. *Gibbons Machine Co.*

For more data insert No. 21 on postcard, p. 35.

## Forcing Press

**10-ton hydraulic; simplified design for quantity production.**

The Model F-101 is floor mounted, with an 18x20-in. table 26 in. above the floor. Standard models have a 3-in. U slot in the table. Gap or daylight is 22 in.; reach is 10 in.; and maximum stroke is 12 in. Completely self-contained, with a 5 hp vertical motor and an 11 gpm constant volume pump, the press has an adjustable relief valve that makes it possible to set maximum pressure at any point from 10 pct



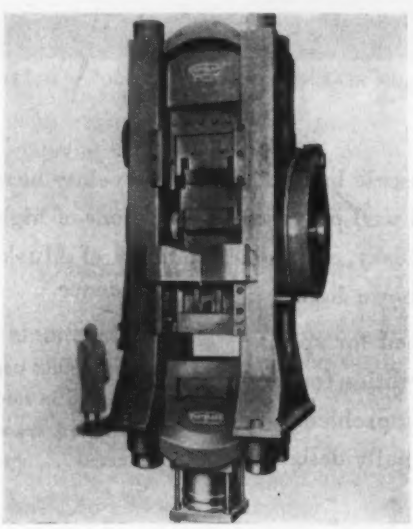
of capacity to full, 10-ton capacity. The ram is guided to prevent rotation and return stroke is adjustable. Single manual lever control is standard equipment. *Hannifin Corp.*

For more data insert No. 22 on postcard, p. 35.

## Knuckle Joint Press

**Double geared, twin drive, air friction clutch; capacity, 2500 tons.**

The press is arranged with air cushion in the bed and with pads on uprights and rear slide for



mechanical pick-off attachment. The cushion has 50-ton capacity at 75 lb of air pressure, and 3-in. travel. The slide has 10-in. stroke with ½-in. adjustment. Face of the slide measures 30x36 in.; bed area 42x48 in. *Cleveland Punch & Shear Works Co.*

For more data insert No. 23 on postcard, p. 35.

## Pneumatic Marker

**New single-stroke unit speeds marking of hot metal products.**

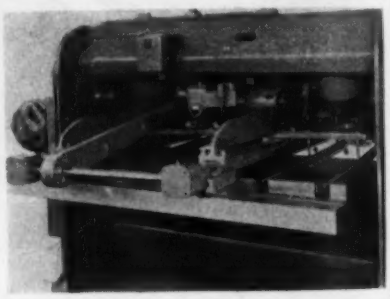
Ingot, cut, heat and weight numbers or letters are stamped at the same time on steel ingots, billets, bars, and other hot metal products with the new marker. It has an automatic head trip; holds up to 13 interchangeable ¼-in. grooved steel type characters; and weighs 100 lb. It operates on a ¾ in., 80-100 lb pressure air line and is mounted on a life-lubricated carriage and wheels for angle-iron, channel or beam support. *Pannier Corp.*

For more data insert No. 24 on postcard, p. 35.

## Magnetic Sheet Support

**No-sag support aids in gaging light gage sheet to be sheared.**

The purpose of this attachment for Cincinnati all-steel shears is to support the sheet to be sheared



so that it can be pushed against the back gage angle for accurate gaging. The support is built with permanent Alnico magnets, with a roller arrangement that provides easy handling of the sheet when feeding the shear. There is said to be no noticeable drag on the sheet due to the magnetic holding, and the back pieces will automatically strip off as the piece is cut. The support handles magnetic materials up to 16 gage thickness and can be supplied with 36 or 48 in. back gaging range. *Cincinnati Shaper Co.*

For more data insert No. 25 on postcard, p. 35.

## Direct Flow Pumps

**Direct flow principle results in greater efficiency, economy.**

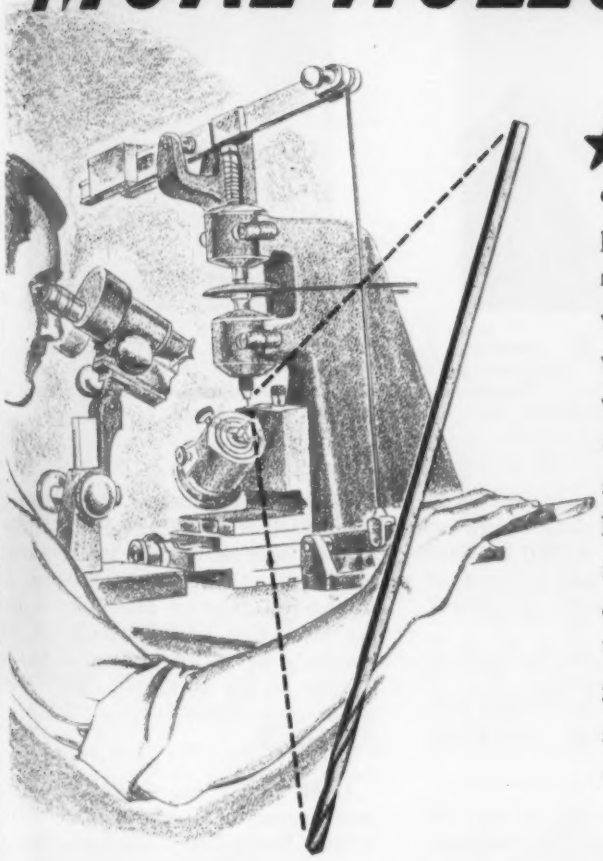
Designed to permit direct or through-flow of liquids, the new Aldrich pump features a revision

*Turn to Page 102*

# LARGE OR SMALL . . .

## CLE-FORGE HIGH SPEED DRILLS GIVE YOU

# MORE HOLES PER GRIND!

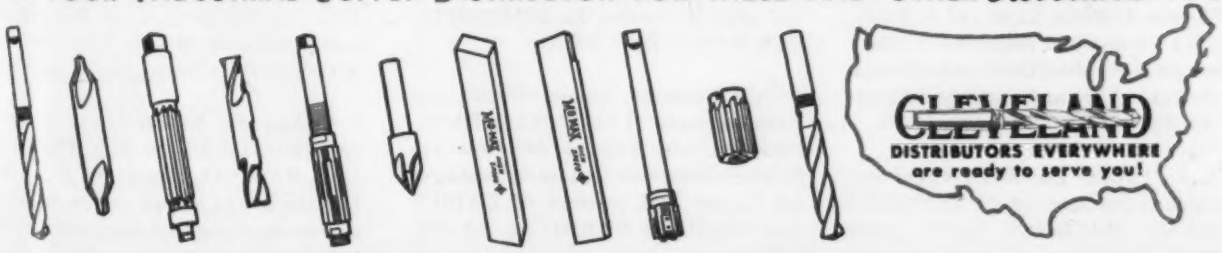


★ Did you ever sharpen a tiny drill .020" in diameter? It's a tricky job, and makes you realize the importance of getting *more holes per grind.* ◈ A shop making jet nozzle parts of #347 stainless steel was having difficulty drilling very small holes. Drills were averaging less than 9 holes per grind. The job went slowly, and costs were high. ◈ When a ***Cleveland*** Service Representative was called in, he suggested switching to the CLE-FORGE High Speed Drill illustrated here (greatly enlarged), and changing the speed from 800 to 1200 R.P.M. The number of holes per grind *was increased to more than 50!* ◈ When *you* have a drilling problem, let a ***Cleveland*** Service Representative help you step-up production and cut your costs. Contact our nearest Stockroom, or . . .

**Telephone Your Industrial Supply Distributor**

**THE CLEVELAND TWIST DRILL CO.**
**1242 East 49th Street • Cleveland 14, Ohio**
*Stockrooms:* New York 7 • Detroit 2 • Chicago 6 • Dallas 1 • San Francisco 5 • Los Angeles 58
*E. P. Barrus, Ltd., London W. 3, England*

ASK YOUR INDUSTRIAL SUPPLY DISTRIBUTOR FOR THESE AND OTHER ***Cleveland*** TOOLS



# Iron Age *Introduces*

RICHARD E. KRAFVE, who takes over the general managership of the newly created defense production division, Ford Motor Co.

W. C. SNYDER, JR., manager, metallurgical dept., engineering and construction division, Koppers Co., Inc., named president, Freyn Engineering Co.

CHESTER M. ADAMS, appointed vice-president in charge of production and research, Crobalt Inc., Ann Arbor, Mich.

**Ralph W. Dickson** has been made division superintendent of the central mills, Gary Steel Works, CARNEGIE-ILLINOIS STEEL CO. **Otto A. Clarke** was named assistant central mills division superintendent and **Richard Lenahan** succeeds Mr. Clarke as rail mill superintendent.

**John S. Lear** was promoted to the position of executive vice-president for LUDGATE, LEAR & CO., INC., Pittsburgh. **Charles L. Boleky** was named to the post of vice-president in charge of sales. Messrs. **John P. Ludgate** and **Arjay Thomas** remain as president and treasurer, respectively.

**Edward W. Addis** was appointed to the sales staff of GORDON & KINNEY, INC., Detroit. Mr. Addis was formerly associated with ROWE METHODS, INC., where he was sales manager.

**Thomas J. Wood, Raymond A. Frick, Ralph C. White** and **Raymond A. Martinson** have received new appointments in the brake shoe and castings division of AMERICAN BRAKE SHOE CO.

**A. L. Palmer** has been appointed production manager of BURROUGHS ADDING MACHINE CO.'S main plant in Detroit.

**C. J. Lynch** was appointed controller of the newly formed defense production division of the FORD MOTOR CO. **John F. Cooney** will be manager of the salaried personnel department.

**J. E. Weldy** was appointed marketing manager, **J. S. Gillespie,** product sales manager, and **J. M. Bertotti,** field sales manager, for the CARBOLOY CO., INC., Detroit.

**Lemuel B. Hunter** was handed the post of industrial relations manager of INLAND STEEL CO., succeeding **William G. Caples.** Mr. Hunter has been manager of the raw materials department which has charge of the company's iron ore and coal mining properties. **Carl B. Jacobs,** fleet manager, was named to succeed Mr. Hunter.

**John P. Mullen** has been placed in charge of public relations, advertising and sales promotion for HUNT-SPILLER MFG. CORP., Boston.

**Neal Robinson,** former West Coast sales manager of the DOYLE PACKING CO., Los Angeles, has been appointed household foil sales manager for Kaiser Foil, product of KAISER ALUMINUM & CHEMICAL SALES, INC.

**Neele E. Stearns** was elected president of INLAND STEEL PRODUCTS. He has been serving as top operating executive of the firm. **William G. Caples** was elected president of INLAND STEEL CONTAINER CO. He formerly was acting vice-president in charge of the company. Both companies are subsidiaries of INLAND STEEL CO.

**C. M. Jessup** has been named general manager of ALLISON - BEDFORD FOUNDRY, Bedford, Ind., a newly created division of GENERAL MOTORS CORP. The Bedford foundry formerly operated as a division of Allison. It will remain a part of the Engine Group in which it has been operating since its establishment.

**Robert M. Norton,** until recently assistant sales manager, was promoted to the post of sales manager for the HANSON - VAN WINKLE - MUNNING CO., Matawan, N. J. He will also assist **John A. Bauer,** vice-president, with general administrative problems.

**George H. Kinzel** was appointed sales manager of the O. Z. ELECTRICAL MFG. CO., Brooklyn, N. Y. **Roy Comstock** was named as electrical engineer in charge of engineering contact for the company.



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F. A. **Teeple, Jr.,** was named manager of the newly formed product engineering department of the ATLANTIC STEEL CO., Atlanta. He previously served as superintendent of the company's manufactured products division. Mr. Teeple's supporting staff of metallurgical and product engineers is composed of **Fred O. Reese, Emmett R. Rushin, Lawrence A. Wallace** and **Michael F. Wiedl, Jr.**

**Robert G. Robey,** formerly assistant to the executive vice-president, becomes vice-president of BATES EXPANDED STEEL CORP., East Chicago, Ind. **Alex Russell,** formerly assistant treasurer, has been elected treasurer.

**Daniel B. Altman** was appointed by the KULJIAN CORP., Philadelphia-engineers and constructors, to head its new department of management engineering.

**Albert L. Gutterson** was elected president of the LOVEJOY TOOL CO., INC., Springfield, Vt. **George A. Perry** was elected a director of the company, succeeding the late **Charles N. Safford.**

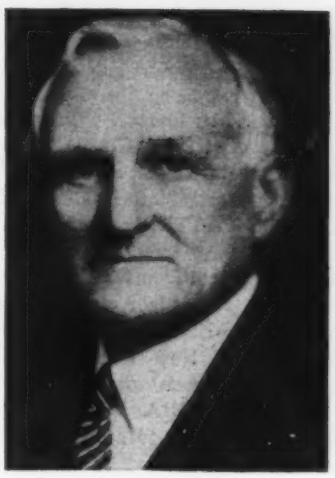
**Raymond A. Sternthall** was named to the post of branch manager of the Los Angeles office and warehouse of CHASE BRASS & COPPER CO. Mr. Sternthall succeeds the late **T. Franklin Day,** who passed away recently. Mr. Day had been manager at Los Angeles for 16 years.

**M. G. Sladek** was promoted to district sales supervisor and will take charge of accounts in Minnesota, Iowa, Wisconsin and most of Illinois and Ohio for LA SALLE STEEL CO., Hammond, Ind. **Paul L. Bisdorf** was added to the company's sales engineering staff.

CARL M. PETERSON, handed the post of director of wage and salary administration, Pittsburgh Plate Glass Co.

# Iron Age Salutes

## DONALD BURTON GILLIES



THE wisdom and experience of 78 years, 55 of them spent productively in the steel and mining industries, and a mind still incisive and young, do not lend themselves to retirement. Donald Burton Gillies proved this when 2 years ago he tried to retire from his post as vice-president of Republic Steel Corp. Now he is mining consultant to the firm, working at a tempo which would sap the energies of some much younger men. He opens his office at 7:30 a.m. and pays scant attention to the clock.

Vice-president of Republic Steel for 13 years, now president of the Lake Superior Iron Ore Assn., and a past president of the American Institute of Mining and Metallurgical Engineers, Mr. Gillies migrated from Canada to Michigan to work his way through high school and later the Michigan Mining School, now Michigan Tech.

With the panic of 1893 in full swing when he picked up his sheepskin, he followed the advice of Horace Greeley and went West to work in Butte, Mont., as a slag pot pusher at a copper smelter.

Brains, plus his willingness to work harder than most, brought him the job of handling copper and silver mines for the Montana Copper King, Sen. W. A. Clark, then owner of the United Verde Copper Mines.

He later spent some years in the gold and silver fields of Tonapah and Goldfield, managed mines for Charles M. Schwab in Mexico, did the same for the Corrigan-McKinney Co., despite political explosions and Pancho Villa. In 1918 he became vice-president of Corrigan-McKinney, then president, and in 1935 a Republic vice-president when the firms consolidated. After retirement proved a failure, Mr. Gillies continued as Republic's chief counsellor on mining problems.

Under his direction, Republic has been constantly exploring for new ore supplies at home and abroad. The company has purchased a controlling interest in the Liberia Mining Co. and is one of several firms investigating ore deposits in Labrador. It holds title to property in Mexico.

Mr. Gillies is an unwavering supporter of the proposed St. Lawrence Waterway.

HOWARD H. WILDER, who becomes manager, Iron Foundry Div., Vanadium Corp. of America, with headquarters in Detroit.

FRANK B. RACKLEY, formerly executive vice-president of Jessop Steel Co., who was recently elected president of the company.

NORMAN F. TISDALE, JR., named to the post of development engineer, Molybdenum Corp. of America, Pittsburgh.

**James B. Weaver** has been appointed techno-economist in the commercial evaluation department for OLIN INDUSTRIES, INC.

**M. W. Heinritz,** formerly vice-president of GOULD STORAGE BATTERY CORP., was elected vice-president in charge of industrial sales of GOULD-NATIONAL BATTERIES, INC.

**Joseph Varacalli** has been named dealer sales supervisor for ALLIS-CHALMERS' Empire region with headquarters in New York City. He succeeds **J. R. Queen,** who resigned to join the COLUMBIA MACHINE & ENGINEERING CO., Hamilton, Ohio.

**John M. Miller** was made assistant general manager of the tire division, U. S. RUBBER CO. He will headquarter in New York.

**A. B. Vestal,** assistant to the president, FIRTH-STERLING STEEL & CARBIDE CORP., McKeesport, Pa., has left that position to join the staff of EDWARDS & BARNES, management consultants, Pittsburgh.

**John B. Powell** has been named manager of the engineering division of GENERAL ELECTRIC'S apparatus department New England district. Succeeding **George H. Jump,** who has been appointed engineering consultant for the district, Mr. Powell will be located at the company's New England headquarters in Boston.

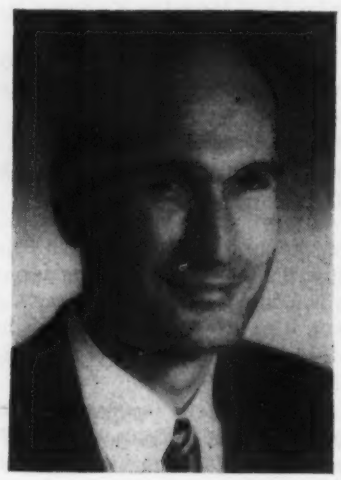
**Fred S. McCarthy** takes over as sales promotion manager for the WESTINGHOUSE television and radio division. He was formerly associated with JONES & FRANKEL CO., television producers, as sales promotion director.

**Haran W. Bullard,** an employee of TENNESSEE COAL, IRON & RAILROAD CO., has been appointed superintendent of the company's Fairfield Steel Works. He previously served in the capacity of roll designer.

**F. A. Dahlquist,** of PENNSYLVANIA SALT MFG. CO., has been elected president of the Detroit Chapter, American Material Handling Society for 1950-1951.

**Richard M. Friddle** and **Richard A. Frazee** have been assigned to ALLIS-CHALMERS' Cleveland and St. Louis district offices, respectively, as sales representatives. Both Mr. Friddle and Mr. Frazee recently completed ALLIS-CHALMERS graduate training course. **Carl R. Froeba** has been named a sales representative in the Atlanta district office.

GLENN F. IHRIG, who becomes assistant sales manager, Wellman Bronze & Aluminum Co., Cleveland.



COURTLAND F. CARRIER, named technical adviser of the fabricating division, Western Brass Mills Div. of Olin Industries, Inc.

LEONARD D. WOODS, appointed assistant sales manager, Round California Chain Co., Los Angeles.



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## SEVEN STRONG REASONS

**A better steel for the purpose in hand has always found favor with manufacturers of commercial vehicles . . . currently the trend is to N-A-X HIGH-TENSILE steel.**

MAKE A TON OF SHEET STEEL GO FARTHER

Specify—

**N-A-X**

HIGH-TENSILE STEEL

**GREAT LAKES STEEL CORPORATION**

N-A-X Alloy Division, Ecorse, Detroit 29, Michigan

NATIONAL STEEL CORPORATION

# On the ASSEMBLY LINE

## AUTOMOTIVE NEWS AND OPINIONS

**Nash Rambler runs smoothly . . . Chrysler plans plant . . . Detroit to feel effect of armaments orders when light plates are made on sheet mills . . . New battery to debut.**

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By WALTER G. PATTON

**Light but Stable** — Although economy is a big attraction, the outstanding feature of the new light cars will undoubtedly turn out to be exceptional riding qualities and ease of handling. During a 591-mile trip this past week-end in a Nash Rambler convertible, these qualities greatly exceeded our expectations. Others who rode in the Nash were lavish in their praise of the car's superior ride.

Behind the wheel there is no indication to the driver that the car weighs substantially less than other passenger cars on the road. There is a feeling of stability that is entirely unexpected. We cruised comfortable at 60-65 miles per hr. The auto engineers stock argument that you need a car a block long to get good riding qualities is no longer valid.

**Chrysler Builds**—Chrysler has taken out an option to buy 105 acres in Marion County outside Indianapolis for the production of auto parts, including transmissions. Zoning, sewer and other facilities have not been completed, according to a company spokesman. The proposed plant comprises 650,000 sq ft and estimated employment is 5000. Dodge Div. will operate the new plant which is being designed by Albert Kahn, Detroit. At present, Chrysler transmission production is centered at Dodge-Main, although some components are made at Kokomo, Ind.

**To Suffer Most**—Assuming there is an appreciable increase in rearmament projects, the effect on automotive steel supply may be out of proportion to the tonnages required. Here's why: light plate tonnage will have to be rolled on mills producing sheet today. There are almost no single purpose plate mills left in the country except those used for very heavy plate.

At the moment, a substantial amount of automobile tonnage is based on conversion ingots. It has been estimated that the tonnage moving to the auto industry taken from these sources totals 70,000 tons a month. With alloy coming back fast in the form of orders for aircraft engine and bearing steels, this electric furnace capacity may not be available for conversion tonnage.

**In Dormant State**—A survey of automobile parts makers discloses that the defense program requirements have not yet passed the inquiry stage. Firm orders from plant contractors, however, are expected before the fourth quarter. Meanwhile, these plants are continuing their high volume production of parts for 1950 models.

**For Instant Starts**—A new grid material has been developed by a major battery producer for a battery to be introduced in the near future. The battery is aimed at the replacement trade. It features a new active material developed to make snap-starts in high compression engines. Other features are a new structure for the container, a new sealing compound and new insulators.

**"Freeze" Stimulus** — Most Detroit labor experts believe the threat of a freeze has contributed tremendously to the growing union pressure for wage increases. Recently, Ford Local 600 UAW-CIO voted for strike action January 2, 1951, unless union wage demands are met. The strike vote is set for December.

Ford has replied that the local is not empowered to speak for all Ford employees and that the company intends to stick to the reopening date 30 to 60 days ahead of Jan. 1, 1951, as called for in the contract. Meanwhile, Local 600 has brought charges of Communism against five members of the local. A full-scale campaign to

oust Communists from Local 600 is underway.

**Poor Timing**—While the Ford local is campaigning to give the heave-ho to the Commies, Packard is presently hamstrung by a strong left wing element which called a strike on the eve of the introduction of its new 1951 models. Packard has offered the union a choice of two plans: Plan 1 calls for a union shop, $100 a month pension including social security at age 65, 5¢ an hour wage increase, increased insurance benefits, increased pay up to 80 hours in lieu of vacations.

Plan 2 includes a pension agreement based on the General Motors plan calling for $117.50 maximum per month. This proposal also includes a GM-type cost-of-living clause, a wage increase, improved insurance, increased pay in lieu of vacations and other benefits. Packard claims this offer exceeds the benefits offered by Nash, Chrysler and Briggs. There is no present indication that the union is prepared to accept either of these proposals.

**The New Packard**—The all-new, completely restyled Packard introduced this week features a hood with a distinctive downward sweep, grille-work nearly 5 in. lower than previous models and a one-piece windshield nearly 5 ft wide. The right front fender is visible to the driver. Front corner pillars are the narrowest in the industry. Rear windows are "windshield-wide" and the "300" and "400" models have the "wrap-around" rear window that has become so popular in so-called hardtop models.

Rear seat hiproom is 62 in., a full 12 in. wider than the previous model. Headroom is ample and rear seat legroom has been increased 6 in.

The one-piece windshield has full-width defrosting, a new vanity-drawer in the instrument board and single button control of all headlights are other features. Cars will be available in nine body styles. Compression ratio of the "400" engine is, for the time being, tops in the industry. The ratio of 7.8 to 1 for the Packard Patrician "400" engine which has nine main bearings is the highest yet.

Packard's investment in its 1951 cars totals more than $15 million for engineering and tooling. It is expected that 90 pct of the new 1951 models will be equipped with Ultramatic drive.

**Diesels in Canada**—With the U. S. job of converting American railroads over to diesel well under way, GM has embarked on a program to dieselize the Canadian railways. At the start, there were 42,000 U. S. steam locomotives. According to C. E. Wilson, president of General Motors, the U. S. conversion job is now half completed.

There are about 4200 steam locomotives operating in Canada. Because of the colder weather and greater distances involved, GM figures the economic position of the diesel is even sounder in Canada than it is in U. S. Savings in operating costs may run as high as 50 pct according to GM estimates. At its new plant at London, Ont., GM will make one locomotive unit per day. Current production at LaGrange, Ill., is nine units per day. Estimated cost of the Canadian changeover is $500 million.

**Finger Touch Brake**—Automobile engineers have finally gotten around to the long neglected parking brake. Last week Chrysler and DeSoto announced the new brake that can be set on the steepest incline with the pull of a single finger and can be released just as easily. The new brake is entirely enclosed and has a Cyclebond lining that operates on the drive shaft and not on the car wheels.

The parking brake drum is enclosed so that oil, water and dirt are kept out. A Cyclebond lining is employed. Adjustment of the brake mechanism is greatly simplified, according to Chrysler engineers.

**THE BULL OF THE WOODS** — By J. R. Williams

ON YOUR TRIP, DAN, DON'T FAIL TO RUN OUT TO THE SHIP-YARDS AND SEE OUR BIG CRANES THERE!
DO YOU THINK I'M CRACKED? I GET ALL I WANT OF IT HERE WITHOUT BEIN' NUTTY ENOUGH TO VACATION ON IT, TOO!
THEY GOT TH' BULL ABOUT INFLUENCED TO TAKE SUCH A TRIP, BUT TH' FIRST ONE HE TRIES TO INFLUENCE DON'T INFLUENCE!
THEY BOTH STARTED HERE TO-GETHER, AN' DAN AIN'T GOT OVER IT YET, IS ALL THAT IS!
8-25
J.R.WILLIAMS
THE OLD REBEL

## . . . when you use "NATIONAL" Graphite Stool Inserts

● *It is impossible for molten metal to stick to graphite under any conditions.* This means that an ingot cannot possibly stick to a graphite stool insert. If you are bothered with stickers, equip your stools with "National" graphite stool inserts.

Think of the savings!

No lost time in freeing stuck ingots. Keeps maintenance costs down. For complete information on "National" graphite stool inserts, write to National Carbon Division, Union Carbide and Carbon Corporation, Dept. IA.

*The terms "National" and "Eveready" are registered trade-marks of*

**NATIONAL CARBON DIVISION**
**UNION CARBIDE AND CARBON CORPORATION**
30 East 42nd Street, New York 17, N. Y.

District Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

Foreign Department: New York, U. S. A.

**MORE THAN DOUBLE THE USABLE LIGHT!**

The biggest news since the invention of flashlights—the brand new leakproof "Eveready" No. 1050 flashlight battery—gives more than double the usable brilliant white light for critical uses than any other flashlight battery we have ever made. NO METAL CAN TO LEAK OR CORRODE.

# WEST COAST PROGRESS REPORT

**Digest of Far West Industrial Activity—By R. T. REINHARDT**

**Mill Base on Sheets**—After the announcement by Columbia and Geneva, U. S. Steel subsidiaries, that production of hot rolled sheets and tinplate would be boosted at these western plants, came the announcement last week that Geneva Steel Co. was establishing a mill base price of 3.45 cents per lb on hot-rolled carbon steel sheet.

These prices are quoted as being effective Aug. 16 although completion of facilities to produce hot-rolled sheets will probably not be completed until next year. The prices quoted currently will apply, it is understood on hot-rolled coils in 16-gage and heavier which are currently produced at Geneva.

**Whence the Ingots?**—These enlargements of rolling facilities stimulates still further speculation that the Geneva plant is contemplating increased ingot capacity there although no announcement has been made. Rumors persist that two additional openhearths are being considered.

**Scrap Tightens**—Current high rate of production in the West continued to put a strain on scrap deliveries and higher prices being offered by the mills have helped but little to increase the flow. Last week San Francisco prices for steelmaking grades advanced in line with those previously effective in southern California and Seattle. No. 1 heavy in San Francisco is bringing $23.50 per gross ton.

Some slight easement in supply may come from a dribble of shipbreaking in southern California where a repair vessel and submarine tender and a destroyer tender are under the cutting torch.

**Still Some Idle Furnaces**—Although ingot production in the West is hovering around the 100 pct of capacity mark, there are still some idle furnaces.

Isaacson Iron Works in Seattle has no plans to open its Plant 2 furnaces except occasionally to turn out ingots for the company's own needs.

The electric furnaces of Pacific States Steel Corp., Niles, Calif., are still on a standby basis and a small electric furnace at Tacoma which operated for a short time last year is also idle.

Northwest Steel Rolling Mills which had been working at capacity in Seattle for the past month producing merchant bars and reinforcing bars faced a temporary work stoppage last week when rolling crews were called out on wild-cat strike. Furnace operations continue at capacity.

**More Bricks from the Sea**—A second 250 ft by 9½ ft kiln being installed by Kaiser Aluminum & Chemical Corp. at Moss Landing, Calif., will increase production of steelmaking refractories.

This installation is expected to eliminate some of the previous bottlenecks in the production of dead burned magnesite, dead burned dolomite and other magnesia products used in the production of brick and ramming materials. The kiln was one of six at the company's Baton Rouge bauxite reduction plant.

**Strategic Anxiety**—In recommending Federal legislative steps to stimulate production of strategic metals, a special mining committee of the San Francisco Chamber of Commerce states that: Mercury lining has declined by 95 pct; less than 10 pct of manganese used is produced in this country; no chrome is being produced domestically; less than one-quarter of our wartime production of antimony is left; and tungsten production is still far less than one-half of our wartime production.

An expansion in the production of ferro-alloys by Pacific Northwest Alloy Co. is anticipated with the installation of a new furnace next month if power can be obtained from the Bonneville Power Administration.

**New Jobber Branch**—Tay-Holbrook Co., steel jobbers with executive offices in San Francisco, have announced plans to set up a $100,000 distributor warehouse in Salinas, Calif.

### Assembling in West

**A comprehensive story and table on the rise of auto assembling in California appears in the News of Industry section, page 85. It was written by Robert T. Reinhardt and Herbert G. Klein and was too lengthy for publication on this page.**

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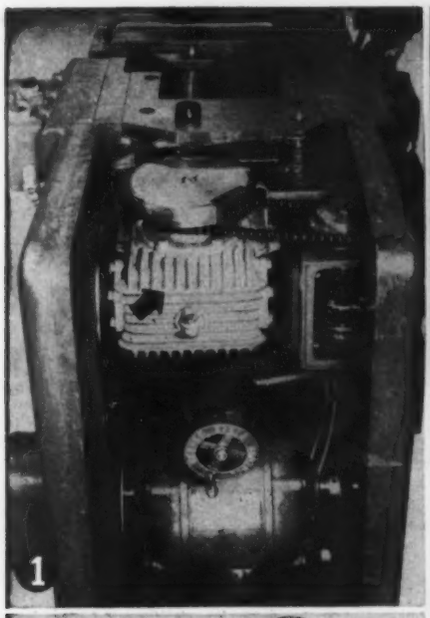


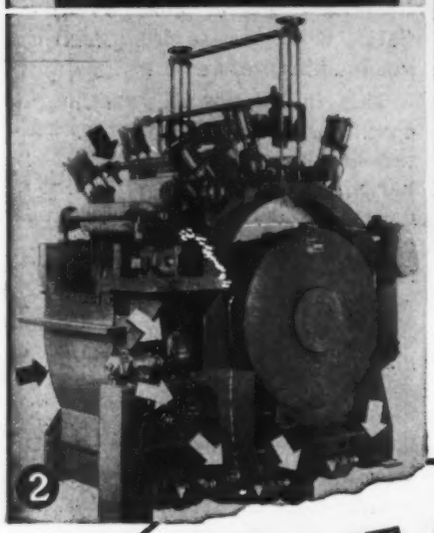


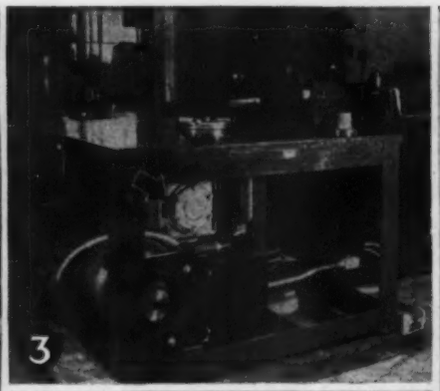


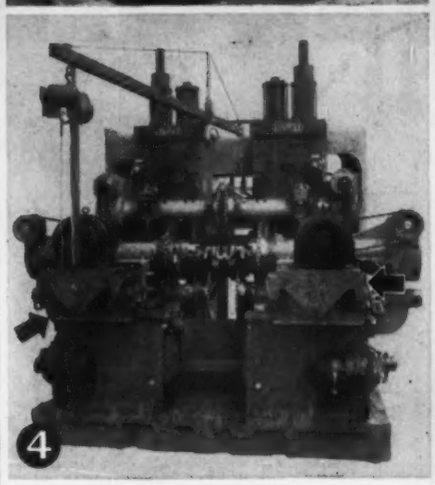


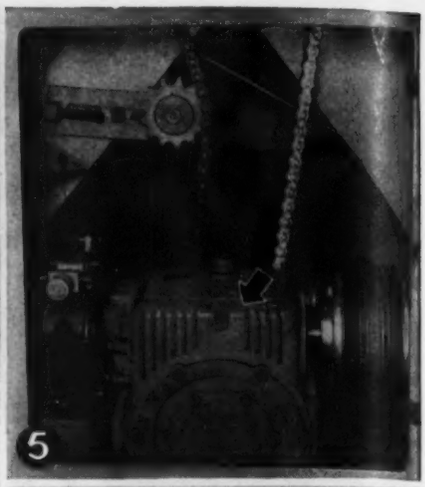


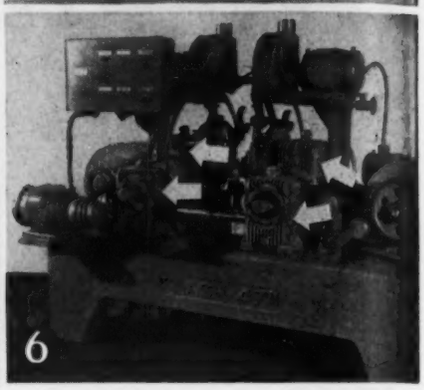


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# COMPACT STANDARD REDUCERS CUT COST OF MACHINE DRIVES

Latest wrinkle in machine design and construction is to use standard stock Cone-Drive Gears reducers instead of "built-in" gearing.

Made possible by the high load carrying capacity and extreme compactness of double enveloping Cone-Drive gearing, the idea does away with special gear designing and bearing calculations, plus the necessary machining of castings, assembling of gears, shafts, bearings, etc.

The variety of machines on which the standard stocked Cone-Drive Gears reducers have simplified and reduced the cost of machine drives is indicated by the examples shown here.

Where, for some reason, use of completely assembled "ready-to-install" speed reducers is not feasible, machine designers in increasing number are specifying STANDARD Cone-Drive Gears, complete with STANDARD MOUNTINGS.

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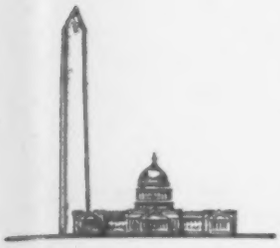

# THE FEDERAL VIEW

## THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

**Control Bill Near** — Congress this week was moving into the final stages of enactment of control legislation. Meanwhile, in the executive agencies predictions were that it would be at least 2 to 3 weeks after passage of the defense production act before even the barest semblance of a priorities and allocations program would be visible. Lack of concrete requirements was still the problem.

Commerce Dept. officials point out, however, that if it is decided to give priority status to such things as the new grain bin program this could be done in a matter of a few days. Nonetheless, there is general agreement that it will be fourth quarter business at the outside that will feel the first noticeable impact of government controls.

**Executive Powers**—While the minor differences between the House and Senate versions of the control bill remain to be ironed out in conference, the major points have been decided. The measure will give the President the authority to grant priorities and allocate materials; requisition property; establish inventory controls; use government funds to expand production; guarantee loans for defense plants; make direct government loans; purchase raw materials and use government funds for exploration, development and mining of metals and minerals; put into effect standby wage and price controls, and rationing; settle labor disputes in defense industries; and control credit. To carry out the industrial expansion, loan and purchase features of the bill, new government corporations are authorized with a borrowing limit of $2 billion.

**Freight Car Needs**—An allocation program for freight car construction is rapidly moving to the head of the list of problems that will confront the Commerce Dept. Col. J. Monroe Johnson, ICC chairman, told THE IRON AGE this week that the freight car shortage is the No. 1 industrial mobilization problem facing the country.

He emphasizes that the government must give a No. 1 priority to freight car production and assure adequate supplies of steel. But even if this is done, Col. Johnson says there will be no relief this year. He points out that trucks are now handling increased traffic and that they will haul more and more as the defense program expands.

**Inventors Mobilized**—The National Inventors Council is stepping up its liaison work between the nation's inventors and the military. Since its inception in 1940, the Council has channeled to inventors the technical problems affecting national defense. During World War II, along with the Office of Technical Services of the Commerce Dept., the Council screened about 250,000 inventions of which 150 proved to be of value to the military.

The Council feels that its current problem is one of meeting numerical superiority with technical supremacy. The Council reaches inventors by putting out periodic lists of technical military problems that need solving. It is estimated that about 25 pct are solved through Council effort. The current list does not reflect any direct needs brought about by the Korean fighting.

**Titanium Method Urgent**—Another problem the military has thrown out calls for a method of welding titanium. Except for special equipment which will probably be required for welding and casting, the military feels it is probable that standard equipment can be used for other steps in the fabrication of titanium and its alloys. Laboratory methods of welding are deemed not practicable for production.

**FTC Vs. F. O. B.**—The Federal Trade Commission may soon have to make up its mind where it stands on freight absorption.

The efforts of a congressional committee to get FTC to tell industry when it can—and cannot—absorb freight charges are scheduled to bear their first fruit this week. FTC chairman James M. Mead is scheduled to answer publicly more than a dozen questions from a Senate "watchdog" committee as to the conditions under which producers may legally pay freight bills on the goods they ship. Insiders who have seen the answers say they accomplish nothing toward clarifying the situation.

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# Induction Hardening Arbor

## USED ON AUTOMATIC SCREW MACHINE

By WALTER G. PATTON
Detroit Editor
THE IRON AGE

**Two automatics at General Motors' Saginaw Steering Gear Div. not only turn bar stock into completely machined bearings, but harden them, too. Hardening is done by induction coil and quench arbors mounted on the tool slides. Method means big reduction in time and equipment for processing and handling.**

A NEW tool—a precision hardening tool—has been added to the versatile and speedy automatic screw machine.

As a result of installing a high frequency internal hardening induction unit on an 8-spindle automatic, Saginaw Steering Gear Div. of General Motors Corp. is able to produce a machined *and hardened* universal joint bearing just 2 min 16 sec after the raw steel is fed into the machine.

While the present operation is still considered experimental, several hundred thousand parts have already been produced successfully. The importance of the operation may be appreciated when it is recalled that an average passenger car requires eight of these bearings. Some models may use as many as 12, including so-called wing-type bearings.

The Saginaw Steering Gear Div. produces millions of such parts every year. Thus any appreciable savings in processing costs or a reduction in time elapsing between the introduction of steel into the manufacturing cycle and delivery of a finished part has considerable significance to company officials.

The new method has many advantages over the conventional means of finishing these parts. It eliminates the steps of copper plating, carburizing, tempering and precision internal grinding, with a great reduction in the total number of square feet required for equipment. It gives a closer control over the hardness pattern. And it effects a substential saving in time between the start of processing and completion of the finished part.

Before a decision was made to install an induction hardening unit on an automatic screw machine, engineers from Saginaw Steering Gear made a careful study of a similar installation in another plant. It was recognized that since nearly half of the metal in the part is heated, the amount of benefit from a metal quench is limited. High hardness both at the sides and end of the piece is essential. Close dimensional tolerances must be held, particularly as to taper. It was also recognized that a considerable amount of operating experience would be required to establish ability of the new part to meet with certainty the severe operating conditions these bearings are subjected to in service.

Another unusual problem was the comparatively long high frequency power transmission line—about 17 ft. In solving this problem, experience was borrowed from the radio industry. A coaxial cable of 3⅛ in. OD was used. This cable, in addition to minimizing transmission losses, has met all safety requirements. It has also solved the problem of possible radio interference resulting from high frequency radiation.

The screw machines being used are standard 1¼ in. 8-spindle automatics tooled for this particular job and fitted with a special inductor quench arbor on the tool slide, at the sixth station, which moves in and out of the bearing in a precisely controlled cycle. Movement of the hardening tool is similar in many respects to the action of the burnishing tool which is also installed on each of these machines. Power for hardening is supplied for 1.8 sec from a single source.

### Power Supplied Alternately

The induction heating power unit is a 450,000-cycle oscillator-type unit rated at 20 kw. Through an automatic transfer switch, this unit supplies power alternately to the induction heating coils on both of the two automatic screw machines now being used for this work.

Material specifications call for 1 1/32 in. ±0.010 in. modified SAE 1144, hot rolled with special quality requirements. The bars are machine straightened, stress annealed and pickled and oiled. Grain size is 1 to 5.

Chemistry specifications are:

| | |
|---|---|
| Carbon | 0.49 to 0.55 pct |
| Manganese | 1.30 to 1.65 pct |
| Phos | 0.040 pct max |
| Sulfur | 0.26 to 0.33 pct |
| Silicon | 0.10 pct max |

The induction hardening arbor is cam-driven on the slide in the same manner as any other tool, except that the cam is especially designed to move the coil into position rapidly and hold it there during the hardening cycle, instead of feeding slowly into the work as a cutting tool would do. A special cam welded to the end of the spindle operates a limit switch to start the hardening cycle. Operation of this switch by the cam energizes a timer which turns on the induction power to the coil for the proper length of time, then cuts off the power and energizes a solenoid which opens the quench oil valve. An automatic transfer switch makes power available to each machine at the proper point in its cycle.

In machining, OD is held within 0.0005 in. and the ID within 0.0012 in. Location of the snap ring groove to the bottom hole is held within 0.002 in.

### Accurate Dimensions and Adjustment Required

The inductor mandrel is turned from fibre glass having a melamine binder. The mandrel and the coils used must be precision-made just like other tools. Both the coil dimensions and the distance from the coil to the work are critical to 0.003 in. in their effect on the depth and pattern of hardening.

The inductor coil is made of 3/32 in. OD copper tubing with 0.016 to 0.020-in. wall. The 3/16-in. sections are soldered to the coil after it is wound and both halves of the quench chamber are assembled.

The inductor coil must be adjusted to within 0.020 to 0.025 in. from the bottom of the hole that is being hardened. This is done by using a flashlight with a circuit so arranged that when the coil touches the bottom of the hole the circuit is closed and the flashlight is lighted. The coil is moved into the hole until the flashlight is lighted and then backed off with an adjusting screw.

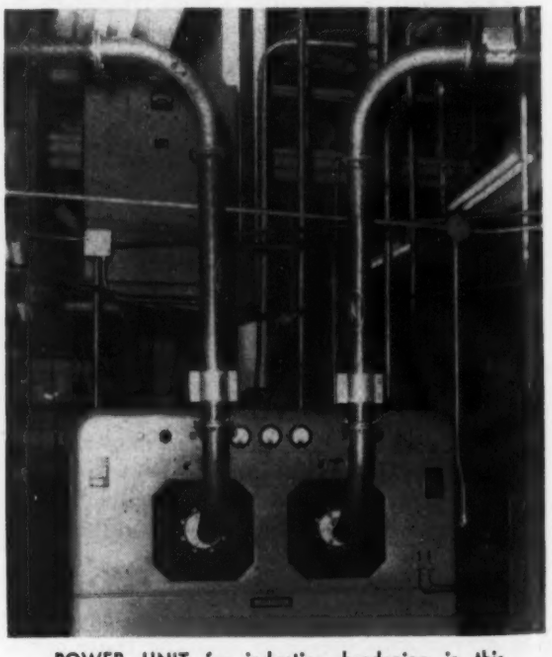
Quenching oil used is a highly refined paraffin oil low in sulfur so as to avoid undesirable discoloration of the parts. Pumps supply quenching oil at the rate of 6 gpm at 100 psi. The principal oil loss is through carryoff in the parts. The quenching oil is, of course, the same oil that is used for a cutting oil.

During quenching, oil is ejected through radial oil holes and slots in the inductor mandrel. The quenching oil is directed both at the sides and at the end of the part.

### Parts Meet Rigid Standards

Minimum hardness required on quenching is Rc 58. Experience has shown that heats containing 0.48 C will harden up to Rc 61, while steel containing 0.54 C has hardened up to Rc 65 using the present heating and quenching cycle.

During the experimental period of operation, parts are being visually inspected 100 pct to insure that the part has been hardened. On hardening, the part is slightly discolored and failure to harden can, therefore, be readily de-



**POWER UNIT for induction hardening is this 20-kw, 450,000-cycle oscillator generator. What look like pipes protruding from the front of the unit are the coaxial transmission lines to the two induction hardening arbors.**



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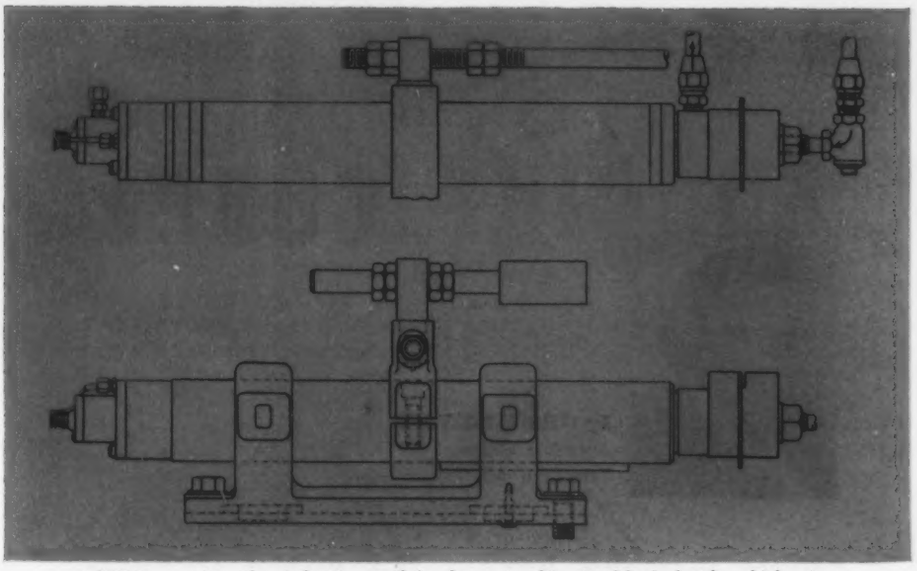


ARBOR carrying the induction coil is shown in this simplified sketch, which gives details of the method of fastening arbor to tool slide. Induction coil is at right.

**HOW THE NEW METHOD SAVES**

1. Eliminates the steps of copper plating, carburizing, tempering, and grinding.
2. Reduces the square feet of floor space required to produce bearings.
3. Substantially reduces the time required to produce a finished bearing.
4. Enables closer control of bearing hardness pattern.

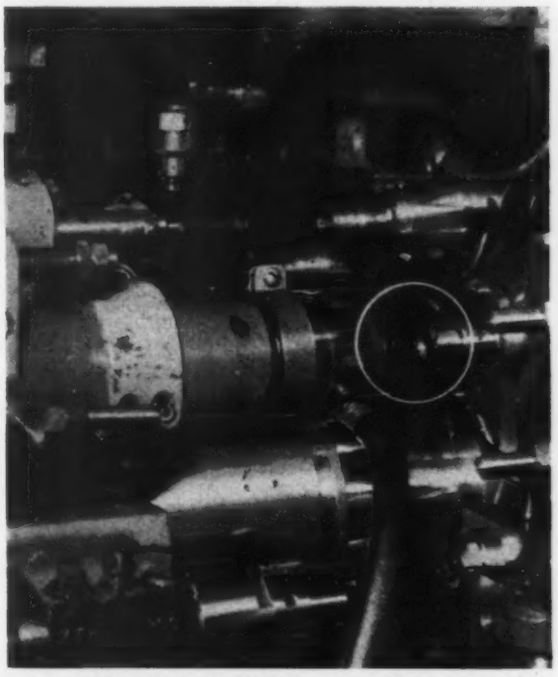
tected. Special controls have been devised which automatically shut down the machine when the relays are off. An air jet blows out all chips just prior to hardening.

Air gages are employed to check OD and ID dimensions. Snap gages are used for other dimensions. Hardness, depth of case, and the hardness pattern are also checked every 2 hr.

Six months' operating experience has shown that machining and hardening operations can be combined successfully in a single machine. Because of the high volume and the fact that copper plating, carburizing, drawing and internal grinding are eliminated, a substantial investment in equipment may be justified. Probably the outstanding advantage is in reducing the processing cycle for each part from several hours to a few minutes.

**SEQUENCE OF OPERATIONS**

1. Knee turn and step drill.
2. Knee turn, counterbore, and finish form.
3. Recess, chamfer, face and groove, and breakdown cutoff.
4. Chamfer, ream, and breakdown cutoff.
5. Breakdown cutoff, and burnish.
6. Induction harden.
7. Shave and ream counterbore.
8. Cutoff.



INDUCTION HARDENING is done at the sixth position on this automatic screw machine. The arbor carrying the induction coil and quench chamber is in the center of the photograph. The coil and work piece show within the white circle.

Meanwhile, service experience is being accumulated which will finally determine whether the exacting requirements for this highly vulnerable part of an automobile can best be met by producing it in the conventional manner—copper plate, carburize, draw, and grind—or by the extremely fast method that combines machining and induction hardening in a single machine. At present, parts are being produced by both methods at Saginaw.

# COBALT 60

By WILLIAM CZYGAN
Associate Editor,
THE IRON AGE

TODAY'S emphasis on exacting quality makes rigid examination of products a necessity for meeting the customer's demands. More and more, radiography is becoming a must. Purchasers of castings and weldments are specifying this form of inspection that presents conclusive evidence of product internal soundness. Also, the high cost of production and material makes nondestructive testing especially desirable. Radiography gives an "inside story" that would be impossible to obtain even with the most careful sectioning.

But since the cost of X-ray apparatus is still prohibitive, many of the smaller operators have resorted to gamma-ray radiography as an alternative. A number of foundries and welding shops do have X-ray equipment up to 250 kv, which suffices for the majority of applications where metal thicknesses rarely exceed 2 in. These, too, use gamma-ray radiography for special work involving heavier sections. However, it is not considered a substitute for, nor will gamma-radiography ever replace, the X-ray.

### Cheaper Than Radium

During the past several years, radium has been the principal source for gamma rays. While the cost of purchasing radium outright is extreme, it can be obtained on a monthly rental basis. Rental fees for a capsule of radium of sufficient minimum amount to penetrate the average casting range from $25 to $75 per month. Recently, however, the U. S. Atomic Energy Commission has made available for industrial use a number of radioactive isotopes, and an equivalent in gamma ray emission may now be purchased outright for less than the cost of two months rental of the radium.

Despite all the current discussion of possible uses for radioactive isotopes, metalworkers, and for that matter industry as a whole, have been slow to avail themselves of these new materials. An aura of mysticism still seems to attend the term "radioactive," resulting in undue prejudices and reluctance to adopt these new industrial tools. In particular, a comparatively few people in the industry are yet aware of the possibilities offered by radioisotopes emitting gamma rays in providing an economical, easy-to-use means for radiographic inspection.

These radioactive isotopes are being produced in ever-increasing quantities, both as byproducts of A-bomb and other fission processes or by irradiation in a nuclear reactor or pile. The former are separated by involved chemical methods, making cost of production extremely high. Irradiation products may be manufactured at comparatively low cost by simply inserting an element in the nuclear reactor for a specified period of time to form the neutron-induced radioisotope.

For industrial radiographic use, an isotope must conform to certain basic requirements. Among the most important of these is that the material possess sufficient strength to keep film exposure time to a minimum, and have a long enough half-life to eliminate constant recalibration. Although a number of other gamma-ray emitters would also be suitable for radiographic purposes, the radioisotope Cobalt 60 offers an ideal compromise of these factors.

$Co^{60}$ has a half-life of 5.3 years, as shown in Fig. 1, and emits gamma rays of two energies, 1.10 and 1.3 million electron volts. The current

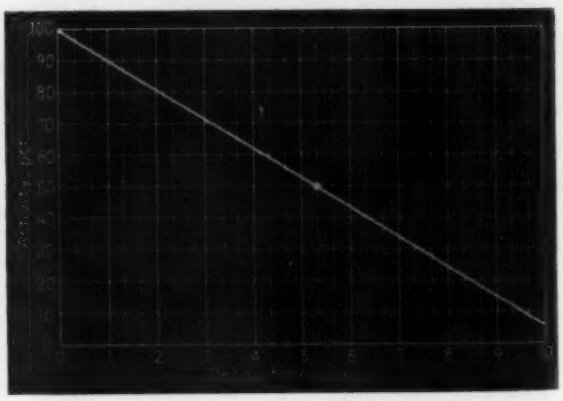


FIG. 1—Decay curve for $Co^{60}$ showing that 50 pct of the strength is gone at 5.3 years. Film exposure time must be recalibrated at least every six months to compensate for this gradual decline in ray intensity.

# FOR LOW COST RADIOGRAPHY

The radioactive isotope cobalt 60 has proved versatile and easy to use for industrial radiography. Results are equivalent to those obtained with costlier radium, yet the cobalt isotope may be bought for less than two months rental cost of the radium. Small shops can now have radiographic inspection with an outlay of only a few hundred dollars.

price, purchased from AEC, is $50 per curie for the first two curies, or fraction thereof, and $5.00 per curie thereafter, plus handling and shipping charges when the entire activity may be considered as one shipment. It is advisable to buy the largest source, in terms of curies (activity measure), that the individual feels safe in handling, since greater activity reduces film exposure times. Where space allotted to radiographic operations is limited, a smaller source is required so that radiation will not extend to workers in the immediate surrounding area of the plant. A $Co^{60}$ source of at least 500 mg radium equivalent is desired, and 750 mg radium equivalent would be even handier.

The argument is heard on all sides that the average chemist or metallurgist, though well qualified in his particular field, is not a nuclear physicist and is therefore incapable of using these new techniques to the best advantage. The ideal situation would certainly be to have a specialist-technician performing the radiographic work, but this is far from being absolutely essential. The important consideration is to be aware of the possible hazards involved and to equip workers with the proper safeguards and a few simple rules for minimizing dosage. An extensive background of special knowledge is not required, and any responsible laboratory or inspection technician can perform radiographic duties.

Such fundamental information as is necessary is contained in a variety of booklets[1] issued by AEC, National Bureau of Standards and the Dept. of Commerce. In addition, The Isotopes Div., AEC, offers, from time to time, a special 4-week training course in radioisotope technique at Oak Ridge Institute of Nuclear Studies, and several universities conduct special day and evening courses on the subject.

To obtain $Co^{60}$, application blanks and instructions for their completion may be had by writing to the Isotopes Div., U. S. Atomic Energy Commission, Oak Ridge Operations, Post Office Box E, Oak Ridge, Tenn. Applications for radioisotopes or irradiation services are then submitted to the Isotopes Div. on form AEC-313, "Application for Radioisotopes Procurement." Form AEC-374, "Authorization for Radioisotopes Procurement," is issued when approval has been granted. The latter is sent, along with a purchase order, to the supplier.

Before buying the isotope, a safe place for storage and usage must be provided. The ideal location for this is an isolated section of the plant. Where facilities are crowded, the storage vault should be proportionately heavier, but in most cases, the general design and thickness shown in Fig. 2 will suffice. The vault shown was built at Penn Steel Castings Co., Chester, Pa., whose facilities for gamma-radiographic inspection rep-

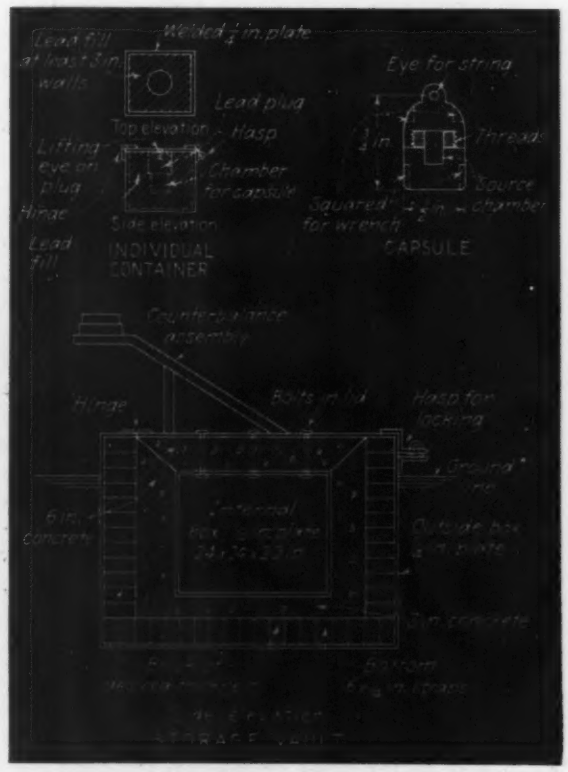



FIG. 2—Typical construction of the storage vault, capsule and individual container for $Co^{60}$. Thickness of the vault brickwork is determined by proximity to other plant operations.

resent one of the best foundry installations to date. This company has found radiography to be an invaluable means of assuring product quality.

The vault was built entirely by labor within the plant, and nearly all the materials were found on the foundry scrap pile. About 7 cu ft of 1:2 concrete were needed, in addition to 220 lb of miscellaneous scrap steel, plate angles, and 350 reclaimed brick. The job required a bricklayer and helper for 4 hr each, 16 hr for a welder, 16 hr for a mechanic and 8 hr for a laborer. The walls of concrete and steel plate are of sufficient thickness to insure complete blockage of any stray rays that might penetrate the individual source containers placed within. The top is counterbalanced to facilitate easy handling.

Individual containers for the sources may be built up of welded plate as shown in Fig. 2 to form a box, or a length of steel pipe, large enough in diameter to provide the required lead wall thickness. These are also made of scrap materials, with the exception of the lead. The lead may either be poured around a form to make the chamber, or the box poured solid and drilled to produce the cavity. A removable lead plug is made for sealing off the chamber.

### Safety Survey Required

The actual capsule for holding the tiny source is machined from a piece of stainless steel, monel or other suitable material as shown in Fig. 2. The eye to which the carrying string is attached should be milled into the body of the capsule; experience has shown that an eye which is merely affixed to the capsule can break off easily, requiring unnecessary handling of the radioactive material to repair. The capsule should be only large enough to prevent its getting lost. The center chamber is generally made about 1/16 in. larger all around than the source, which is later packed in cotton to prevent movement.

When the source has been installed, it is necessary to make a safety survey of the area surrounding the vault or radiographic room. This is done to determine how much, if any, radiation might be leaking through and how far the rays extend from the source location, both during storage and operation of the source. The survey is accomplished with a Geiger counter or some similar detection device, either by plant personnel or hired experts who specialize in this type of service.

### Minimize Contact Time

In handling radioactive material, the chief rule is to stay as far away as possible and keep contact time to a minimum. The capsule should be carried at arm's length on a string, and should only be approached when absolutely necessary. All preparations for making the radiograph should be completed before taking the capsule from its protective container, so that the operator need only suspend the source capsule in position and then move away from the area.

Local health department regulations in some sections might require the use of protective clothing. However, technicians who have worked with the radioactive materials over a considerable period of years are almost unanimously of the opinion that there is little need for special protection in average gamma-radiographic work, since time of exposure to rays is in most cases quite short. Generally accepted safe limits of allowable dosage are set at a maximum of 0.10 roentgens for an 8-hr day. Records kept over a period of almost a year by E. R. Sanford, Chief Metallurgist at Penn Steel and long-time exponent of gamma-radiography, show that personnel dosage never exceeded 0.06, and was usually on the order of 0.02 roentgens, without the use of protective clothing.

The Isotopes Div. strongly recommends that a monitoring device be available for checking daily dosage of persons handling the source. A Minometer or similar instrument of the ionization chamber type is well suited to this purpose. The device deposits an electrostatic charge in a pencil meter, which is worn clipped to the pocket of the operator during the time that he is handling the radioactive source. Whatever rays strike the operator will remove part of the charge in the meter. At the end of the day, the pencil meter is again inserted in the instrument, which measures the amount of charge that was lost during the day; results are read in roentgen units. Periodic blood counts are also recommended as an added precaution. In the final analysis, the best safety device is still distance.

### Recommend Fast Film

Regular industrial X-ray film is also used for gamma-ray radiography. Type of film and length of exposure are governed by the speed with which it is necessary or desirable to make the gammagraph, the thickness of the casting and the amount of radiation available. Weather conditions must also be taken into consideration. During periods of high humidity, the shortest exposure needed to produce a readable film is desired; high moisture content in the air can cause sweating between the lead plates in the holder, making spurious markings on the film.

Films are generally divided into four classes, according to their speeds: (1) extremely slow, (2) slow, (3) medium, and (4) fast. The fastest film available is best suited to foundry work, where high definition is not required for ordinary jobs. Definition and contrast are better on the slower films, but casting defects usually show up just as well on the faster types. Low-cost film holders are obtainable from the film supplier, who can also furnish information on their use.

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These are fitted with thin sheets of lead between which the film is placed.

Except for special work, the focal distance should never be less than 18 in. for metal sections of 3 or 4 in. Longer focal distances are better, giving less distortion, since the rays become more nearly parallel as the distance from the source increases. For best results, the film holder should be as tight against the back of the work as possible. Good contact may be assured by propping something heavy against the film holder or, in the case of rounded surfaces, attaching the holder to the work with tape or a cloth band.

FIG. 3—Typical overnight setup at Penn Steel Castings Co. for radiographing a 16-ft diam flange for a speed ring section of a hydroelectric installation. The source capsule is in the center, and 48 films are arranged around the outside of the 7-ton casting. Section thickness averaged 3 in., requiring about a 16-hr exposure.

A number of pieces may be arranged in one setup, since the gamma rays emit in all directions from the source. After deciding how long an exposure is wanted, the work pieces are arranged in a circle around the suspended source; the work-to-source distance is dependent upon the thickness of the objects being radiographed. For cylindrical jobs, the film holder is wrapped around the outside of the section and the source is suspended in the center. By this means, the entire periphery of the work may be examined in one exposure, as shown in Fig. 3.

Exposure times are calculated with a circular slide rule of the type used in radium radiography. These may be obtained from any of the manufacturers of X-ray films. Factors involved are film type, film-to-source distance, thickness and density of material radiographed and strength of the radioactive source. Setting the film-to-source distance opposite milligrams radium equivalent of $Co^{60}$ on the inner scale of the slide rule gives time of exposure opposite thickness of material on the outer scale. This is multiplied by the factors for film type and material density to obtain the exact correct exposure.

Since the $Co^{60}$ is undergoing continual decay, exposure time must be recalibrated about every six months to compensate for the loss of strength. Additional length of exposure may be easily determined from the percent activity lost during the time elapsed since the source was new.

Identification of the area radiographed is accomplished by marking the area with crayon and then fastening lead numbers over the crayon marks with tape. The lead numbers will appear on the finished film; by aligning the numbers on the film over the crayon markings on the work, it is possible to locate immediately the exact area in which any defects occur. These numbers also serve as a means of cataloging the films for future reference. Films at Penn Steel are filed for periods of from 5 to 10 years and are always available for correlation with service data later obtained on the part.

Selection of darkroom facilities and film processing equipment will be governed mainly by the

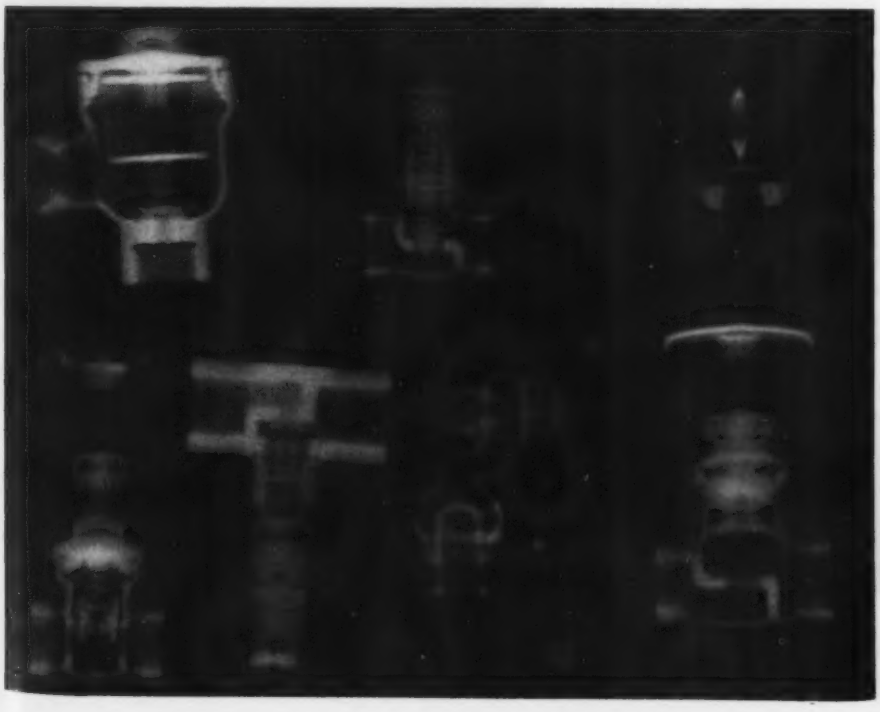

FIG. 4—No masking whatsoever was needed to produce this clear, detailed gammagraph with $Co^{60}$. A number of different materials with varying densities are contained in these valves and fittings. Exposure time was an average for material thicknesses to give clear definition in both light and heavy sections. Even the ceramic portion of the spark plug shows up.

volume of work anticipated. Cost of the installation may be anywhere from less than a hundred to several thousand dollars. Here again, a little ingenuity can result in pronounced savings. A skeleton installation for low-volume processing may be set up by anyone handy with tools.

Processing tanks may be purchased from photo supply houses, but the cost-conscious operator can quite easily construct his own within the plant. Since temperature control is important for good results, means should be provided for keeping the solutions within specified limits.

Hot and cold running water are needed in the darkroom, so the layout should be planned near existing piping. An inexpensive film drying cabinet may be built, incorporating heating elements which can be cut in or out to control temperature. This is almost a necessity, because X-ray film is somewhat thicker than ordinary photographic films and requires too much time to simply air-dry.

Actual film processing is relatively simple; the average batch of films can be run through in 10 to 15 min. As in anything else, the amount of care taken will govern quality of the finished product. A number of excellent handbooks[2] on processing are available from the film manufacturers.

Interpretation of the completed gammagraph shouldn't be difficult for the average foundryman. The defects seen on the film have the same characteristic appearance and outline as those seen when a casting is cut open. With a little experience, the eye becomes more practiced so that minutest details can be readily interpreted.

Obviously, this inexpensive radiographic method does have certain shortcomings. Principal among these is the lack of speed as compared with X-ray equipment of equal strength source. Greater care is required for interpreting gammagraphs, although all the defects do show.

Chief advantage of the $Co^{60}$ technique is its cheapness relative to X-ray and radium sources of equal penetrating power. A basic installation may be set up for as little as a few hundred dollars. Portability is another important feature of gamma-ray work; the small capsule and a few film holders may be easily transported anywhere. Large jobs that would require expensive handling need not be carried to the source for radiography.

No masking to compensate for varying material thickness is required, as is borne out in Figs. 4 and 5. Objects to be radiographed are merely placed against the film holder and exposed. The latitude is broad enough to expose for average section thickness and material densities and still bring out the heavier and lighter sections.

Since the rays emit in all directions, a large number of objects may be arranged around the source and radiographed at the same time. In addition to this, several films may be placed in the same film holder to produce duplicate gammagraphs in one exposure. Often, copies are required for the customer's files, and he in turn may have to furnish a film to his customer or the military. As many as six films have been exposed simultaneously in the same holder with good results.

The slowness of gamma radiography is in some ways an asset, especially in the small shop having only one technician who has to perform multiple duties. Once the work is set up, it may be forgotten for several hours until the exposure is completed, and the technician can go about his other business. Also, jobs may be set up just prior to closing in the evening and set far enough from the source so that the exposure will be completed in the morning.

Shops employing $Co^{60}$ radiography are daily discovering its versatility in uses other than production inspection. For example, one foundry was having failures of the stoppers in their bottom-pouring ladles, with resultant losses of 85,000-lb heats of steel. All the stoppers that had been purchased were radiographed; nearly every one had internal defects such as the one seen in Fig. 6. The company now regularly radiographs representative samples of each lot. No failures have since occurred.

FIG. 5—The joint of this butt-weld on two pieces of steel pipe looked sound from the outside, but gamma-radiography revealed poor contact on the inside.

FIG. 6—Defect (circled) found in a ladle stopper. Imperfections such as this resulted in costly failures, until $Co^{60}$ was used to check each shipment.

## References

[1] "Safe Handling of Radioactive Isotopes," National Bureau of Standards Handbook 42, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. "Isotopes Catalog," Isotopes Div., Atomic Energy Commission, Oak Ridge, Tenn. "Handbook on Radiography," Eldorado Mining & Refining (1944) Ltd., Attn.: R. H. Bull, P. O. Box 379, Ottawa, Canada.

[2] "Radiography in Modern Industry," Eastman Kodak Co., X-Ray Div., Rochester 4, N. Y.



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# New Finish Gives Aluminum Good Wear Resistance

By **CHARLES F. BURROWS**
Research Metallurgist,
Glenn L. Martin Co.,
Baltimore

A NEW scratch and wear resistant hard coating for aluminum, which makes this light metal usable in many applications formerly restricted to steel alloys, has been developed by Glenn L. Martin Co. "MHC" finish, the new hard coating, opens a way for industry to take fuller advantage of aluminum's light weight.

Standard tests on a Taber abrasion tester, using rubber bonded abrasive wheels with a 1000-g loading, have shown the new coating to possess remarkable characteristics. After 50,000 cycles, for example MHC samples showed only half as much wear as did cyanide case-hardened steel.

For surfaces exposed to hard wear, it has been customary to use high strength steel alloys, surface-hardened carbon steels or chrome plate. In many cases the superior strength of the steel part is of no importance to its successful application. Thus a weight saving can be effected through use of aluminum with the Martin finish. This has already proved valuable in aircraft construction. In a typical instance, MHC-treated aluminum bearing races saved 40 lb over the steel assembly formerly needed.

Laboratory development has been under way for over 2 years, and MHC coatings have already been applied successfully to such widely dissimilar items as gears and pinions, surveying instrument parts, turbine impeller blades, hand tools, swivel joints, friction locks, leading edges of high-speed airfoils, cams, pistons and leg braces for paraplegics.

The Martin hard coating has proved out well in its application to the leading edges of high-speed airfoils, which are susceptible to wearing by the surface attrition of dust and rain. Helicopter rotor blade tips, which must often be revved up in clouds of dust, sand or cinders, repsent another noteworthy adaptation. Taking advantage of the lighter metal, many direct MHC-finished aluminum substitutions for steel are being made today in the case of moving parts for Martin airplanes as well as for static surfaces exposed to severe scuffing or other forms of wear.

Fields outside the aviation industry will provide a great many applications for the coating. A sample lot of 5000 leg braces of the type used by disabled veterans recently passed a series of laboratory tests for wear resistance, after hard-coating by the MHC process. Sand and abrasive dust particles to which the hinges are exposed caused many failures to unprocessed aluminum ankle joints.

The Martin finish is applied to aluminum and aluminum alloys containing less than 5 pct cu, either in the wrought or cast form, by an electro-chemical process which creates a nonmetallic, file-hard, highly heat-refractive surface—integral with the base metal. Surface smoothness,

**New Martin process gives aluminum a scratch and wear resistant coating which is file hard, smooth and heat resistant. Wear resistance is superior to that of hard chrome plating or cyanide case hardened steel. Cost may be less than chrome plating or heat treating steel.**

*Continued*

in general, is closely maintained in the processing. The process offers exceptional throwing power, so that uniform coatings may be applied to irregular shapes and recessed areas.

The Martin coating provides excellent resistance to atmospheric and salt water corrosion. Test panels with 0.002-in. MHC films show little corrosion after 14 months of continuous exposure The hard coating is far superior to conventional anodized surfaces. The coat factor, however, often dictates the anodizing of areas of a part unexposed to wear but likely to corrode. Typical are areas where fittings are rivetted to structures. When selective coating is desired, and the non-MHC areas are to be anodized, the whole part is usually anodized first, then masked for selective hard-coating.

With respect to the coating's thermal stability, due to a difference in coefficients of expansion between the base aluminum alloy and the hard finish, checking of the MHC film occur when temperatures exceed 200°F. MHC-processed surfaces also afford a definite margin of heat-insulating protection to the base aluminum, when exposed for short periods to very high temperatures. Martin-conducted tests have revealed that 24ST aluminum sheet with a 0.002-in. surface of MHC will stand up successfully for 1 min to an 1800°F Bunsen burner flame—whereas uncoated sheeting begins to blister at the end of 15 sec and shows pronounced warping.

MHC film is a non-conductor. Standard anodic films show a voltage breakdown of about 340 v, against a range of 500 to 3700 for MHC coatings. Though proof against most commonplace chemicals, the finish is attacked by strong acids and alkalis.

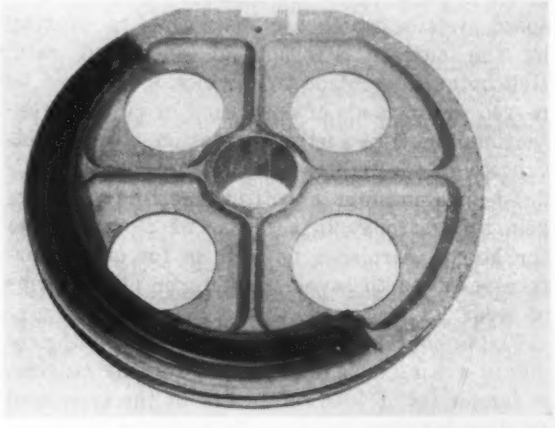
Accurate hardness values for the coating have not been obtained, since standard hardness equipment indentor mechanisms produce too deep an impression for reliable results. The coating may be considered as approximately file hard. Tensile tests of coated alloys show that while the MHC coating has slight effect on the tensile and yield strengths of the material it does cause some loss in ductility. Due to the great hardness of the coating, it does not possess a great deal of ductility. Right angle bends over a $\frac{3}{4}$-in. diam radius have shown that the 0.002-in. coating spalls off on the compression side of the bend and checks finely on the tension side. Impact resistance of the coating is quite good although the coating can be dented and slightly chipped under repeated sharp blows of a hammer.

On repeated cyclic stressing of 0.190-in., 75S-T6 sheet, a 0.002-in. coating has produced a

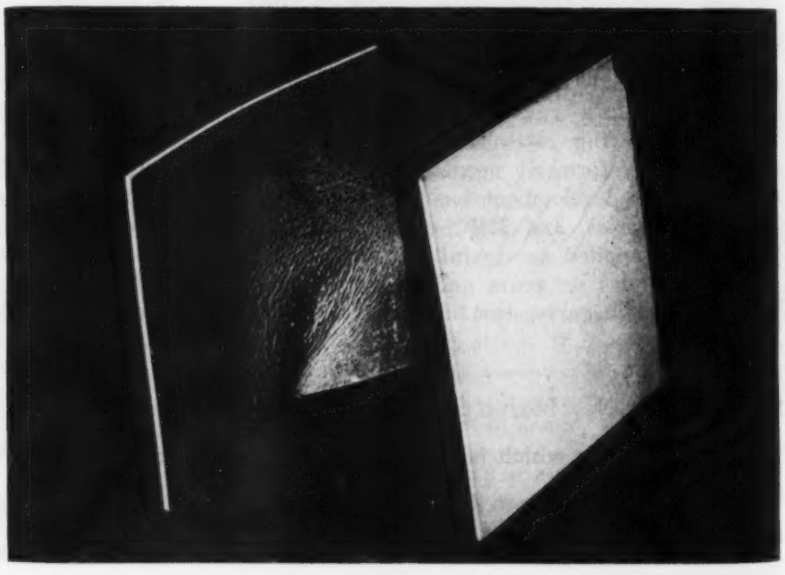
## THESE MATERIALS MAY BE COATED*

| Wrought Products | Cast Products |
|---|---|
| 61S | 645 |
| 75S Alclad | 220 |
| 75S | 355 |
| 24S Alclad | 356 |
| 14S Alclad | 195 |
| 52S | |
| 2S | |
| 24S | |
| 14S | |

* Listed in order of preference for resistance to abrasive wear. Alloys other than these have not yet been treated.



WEAR RESISTANCE: The locking groove (dark area) of this aluminum aileron control quadrant has been MHC coated to prolong its wearing qualities.



HEAT RESISTANCE (right) of MHC coating is shown by comparing coated sample at right with the uncoated product after each was exposed to an 1800°F Bunsen flame for 1 min.

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## EFFECT ON MECHANICAL PROPERTIES

Of 75S-T6 Alclad Sheet

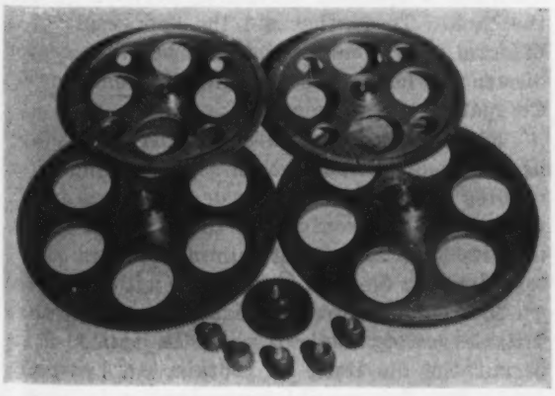
| | Yield Strength, Psi | Ultimate Strength, Psi | Elongation, Pct in 2 in. |
|---|---|---|---|
| As received (uncoated) | 67,420 | 76,170 | 10.0 |
| Chromic acid anodized | 68,530 | 76,940 | 10.0 |
| Sulfuric acid anodized (alumilite) | 69,230 | 78,420 | 9.8 |
| Hard coatings | | | |
| 0.0004 in. film | 67,320 | 76,720 | 9.7 |
| 0.0008 in. film | 68,250 | 77,630 | 8.7 |
| 0.002 in. film | 66,870 | 78,420 | 7.6 |

marked drop in the fatigue life of the metal. This condition follows the normal trend when hard coatings are employed over softer materials. Due to this lowered fatigue life hard-coated structural applications subject to repeated loading in tension, bending or torsion, should be used only after functional tests have proven the application satisfactory.

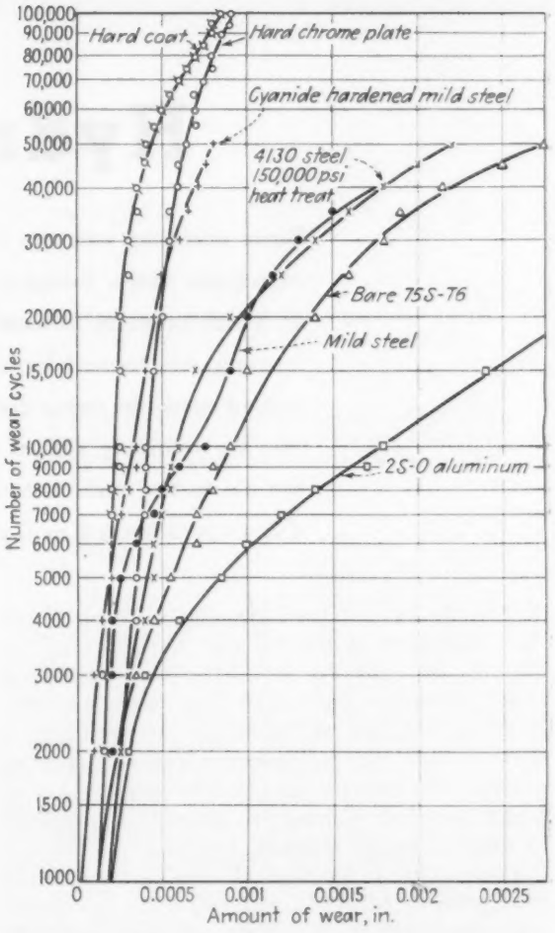
MHC finishes range in color from light to dark gray depending on the alloy and the coating thickness. Coatings run from 0.0001 to 0.006 in. in thickness. Abrasion resistant uses as a rule call for 0.002 in.

MHC coated surfaces exhibit a definite amount of growth which will be proportional to the amount of film applied. The processing results in a coating of aluminum compound integral with the base metal. Through its participation in the reaction this coating is reduced by varying percentages of the coating's thickness, depending on that thickness. To compensate for this, parts to be MHC-processed to, for example, the standard 0.002-in. thickness are normally made up to a minus tolerance representing about one-half the thickness of the proposed finish. Also, advantage can sometimes be taken of the dimensional growth of parts under MHC processing. For example, worn or undersized gears, given a light coating, lose their backlash.

A definite coefficient of sliding or static friction has not as yet been determined, but preliminary tests indicate that MHC film has a lower frictional index than that of untreated metal.



BUILDUP on the surfaces of this gear train made scrapping unnecessary. Coating outside surfaces to 0.00015 in. eliminated backlash.




WEAR EFFECT on materials and coatings was measured on a Taber abraser and plotted on this chart. CS-17 wheels were used with 1000-g loads.

Sliding wear tests involving various combinations of hard-coated and bare metal surfaces with lubricants indicate that maximum resistance to wear is obtainable by use of MHC film with a lubricant of molybdenum sulfide or graphite grease.

Smooth surfaces such as those produced by rolling, forging, grinding or machining afford the best abrasion-resistance results with MHC coating. However rough surfaces may be coated. Sand cast, grit blasted, forged and rolled surfaces may contain small foreign particles imbedded in their surfaces that will lead to imperfections in the hard coating. Hard coatings should be applied as a final operation after all other machining and finishing operations are completed. Samples of rolled 75S-T6 sheet having a microfinish of 4 RMS showed a 16 RMS finish after applying a 0.002-in. coating.

The MHC hard-coating process is relatively expensive as currently applied in a purely experimental basis in the Martin laboratory. On a production scale it would probably compare in cost with such operations as heat treating of steel. It would be considerably cheaper than hard chrome plating.

# Hydraulic Pressure

**Since spinning was too costly a method for producing aluminum tanks, Douglas Aircraft developed a method in which partially formed tanks, after welding and heat treating, are formed by hydraulic pressure. The tank is placed inside the sizing die and hydraulic fluid is pumped into the retaining rubber bag forcing the metal against the die to the final contour. Time required for this final sizing operation is 3 min, pressure used is 400 psi.**

UNCONVENTIONAL methods were found necessary at the El Segundo plant of the Douglas Aircraft Co. in forming an aluminum tank. Several experimental tanks were made by spinning, but this method was too costly for production use. The engineering requirements as to size, strength and shape made necessary some departures from normal procedure in the method of forming finally selected.

Because of the limits established in the stretching of the annealed 61S material being used, tank halves are preformed on a drop hammer and trim lines are located prior to welding, finally producing a cone-shaped section requiring approximately a 6 pct elongation by stretching to obtain the final contour desired.

The operations necessary to prepare the section for forming are extremely important, particularly the welding. Douglas uses an automatic welding machine, with special jigs and fixtures for operation in conformance with the contour of the tank. To obtain a consistent and uniform bead of the weld, it was important to have the butt joint in a straight line with a maximum gap limited to 1/32 in. at any point. This problem is overcome by using suitable clampings and indexing features in the weld fixtures, coupled with a profile templet to guide the torch and maintain a specified dimension between it and the tank. To further aid the end result of a uniform weld, a copper back-up bar is used for dissipating heat, thus reducing the tendency of the material to warp or buckle.

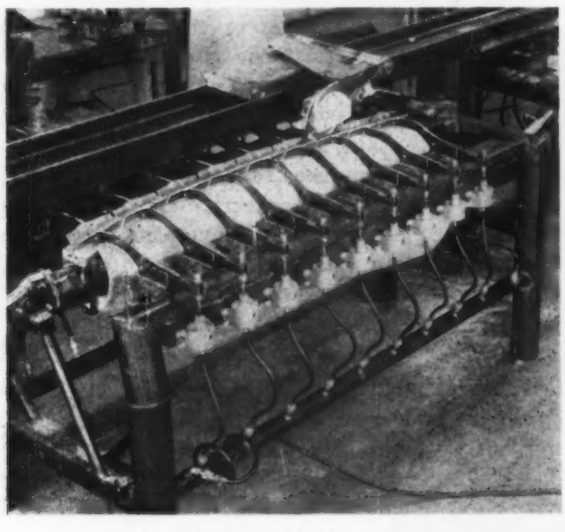


Fig. 1—Trimming gas tank sections prior to butt-weld operation at Douglas Aircraft.

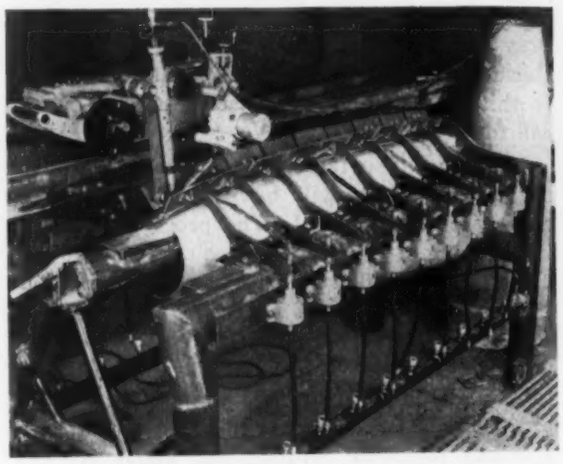


Fig. 2—Automatic welding of gas tank halves prior to sizing operation.

The tolerance required on the overall contour necessitated a new approach in final sizing after welding. A large sizing die or cavity was made, shaped inside to conform to the loft lines of the tank itself. Made of cast aluminum halves bolted together, the die was designed to withstand 500 psi internal pressure. Initially it was felt that suitable sealing methods could be employed to permit the die itself to contain the hydraulic fluid. But this proved impractical, so a single sheet rubber bag was wrapped against the mandrel and fastened to the removable top.



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# Forms Gas Tanks

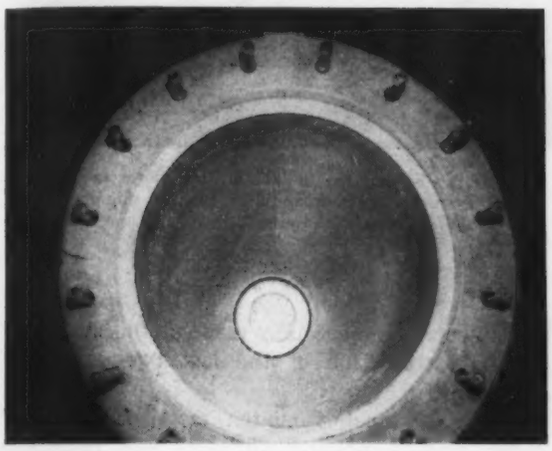
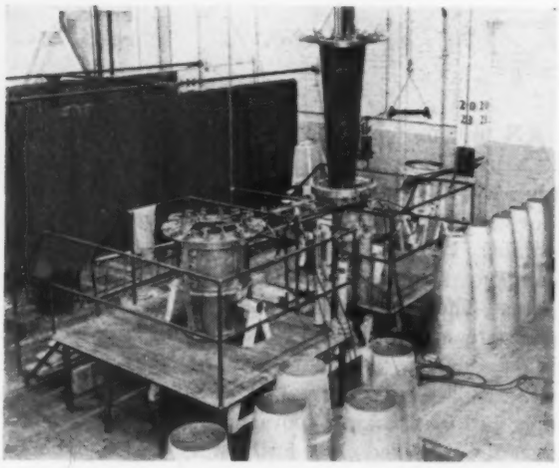


FIG. 3—Left, inside of sizing die, showing air-operated extracting unit at bottom.

FIG. 4—Below, installation of sizing dies at Douglas. Top on die at left is in place. At right, top, mandrel, and rubber bag assembly is being lifted out of die.



A tank, after welding and heat treating, is placed inside the sizing die and hydraulic fluid pumped in, forcing the rubber bag and the metal against the die to assume the proper contour. The necessary pressure in this case has been found to be 400 psi, though it may vary slightly according to the condition of the material at the time of sizing. The time required for the sizing is about 3 min, being merely the time required to pump in about 25 gal of fluid and drain it out again.

Improvements have been made on the sizing die to speed up the overall operation. Automatic air-operated extractors remove the formed section, the top has quick-acting locks, and electric hoists are used for loading and unloading the combined top, mandrel and rubber bag assembly. The whole sizing operation requires only 5 min.

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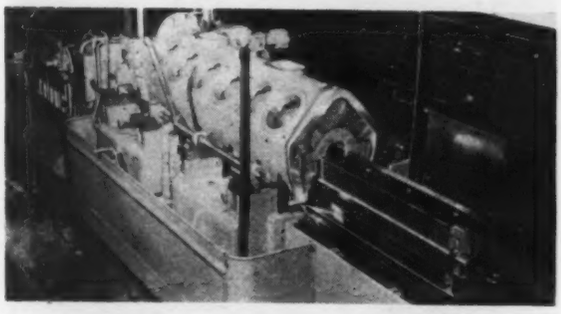
## Six Surfaces Broached in Single Pass

AMONG interesting operations in the new production line for the 12-cyl air-cooled military engine at Continental Motors is the finish-broaching of bearing cap channels and inner faces of cross bolt bosses in the aluminum alloy crankcase casting. Six flat surfaces on each of seven tranverse webs in the casting, plus radii in the corners of the bearing cap channels, are broached in a single pass with the illustrated equipment. Tolerances are 0.002 in. for size and 0.0005 in. for squareness and parallelism. About 0.047 in. depth of stock is removed. Locating pins on the case flange fit into recesses in the platen of the machine for centering. The hand lever on the left actuates a series of four dogs on each side which grip the casting flange, holding it firmly against the platen surface. The machine is a 15-ton, 90-in. stroke Colonial horizontal surface broaching machine.



# Three Furnaces Teem

## 50-TON CASTING

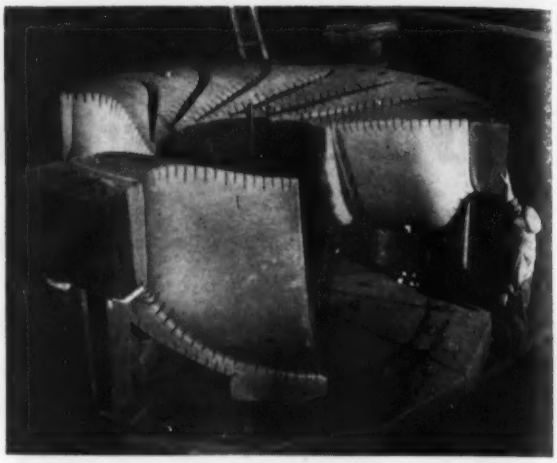


FIG. 1—Setting the individual vane cores in the giant runner casting requires precise alignment for uniform vane thickness.

AN unusual combination of size and intricacy in a steel casting is shown in a 50-ton part for a hydro-electric turbine, cast recently by Falk Corp., Milwaukee. The part is one of four similar Francis Runner castings produced as components of a four-unit installation at Wilson Dam. The unit is for a 35,000 hp single vertical concrete spiral-cased hydraulic turbine, operating under a net effective head of 92 ft.

Setting the individual vane cores was a complex and painstaking operation, in order to maintain the required close uniformity in vane thickness. The vane cores are set on top of the bottom cores on a specially made plate that opens to permit insertion of the last two cores, as shown in Fig. 1.

About 83 tons of molten metal from three 25-ton acid openhearth furnaces was required. The furnaces were overloaded to produce about 90 tons of molten metal, thus eliminating the possibility of pouring short. Careful control was exacted in the simultaneous charging, melting and tapping of the three large heats.

FIG. 2—Simultaneous pouring of the 83 tons of steel needed for a 50-ton finished casting.

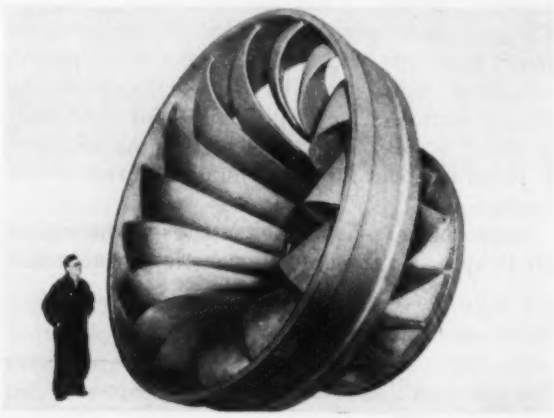


FIG. 3—Finished casting, showing the intricate forms involved and relative size of the turbine runner.

Since the three overhead cranes were to be used at the same time, a special trough had to be constructed for simultaneous pouring of the three ladles, as shown at the extreme left of Fig. 2. Special heavy cross beam clamps were used to lock the mold and prevent a core shift or run-out during pouring.

Fig. 3 shows the finished casting, ready for shipment. In addition to foundry finishing, many additional hours of polishing are required to finish the vane surfaces before installation. A high polish is necessary to prevent pitting.



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# How Much Iron Ore In BRAZIL?

## PART II

By JOHN VAN N. DORR
Geologist,
U. S. Geological Survey

TOTAL reserves of high-grade ore in the Minas Gerais iron region can hardly be guessed at, much less estimated, in the present state of our knowledge. The limited amount of prospecting has already been discussed. Less than 200 million tons of high-grade ore can be considered to be "proved" or "measured" in all Brazil. This should not be taken, however, as a measure of the amount of ore present but rather as a measure of our ignorance and of the lack of development work. There can be little doubt of the probability of several times this amount of high quality ore in the region and of the possibility of much more.

An example of the problems met in estimating tonnages will be cited. In the flanks of the isoclinal overturned syncline exposed in the Conceição area of the Itabira district several tens of millions of tons of pure ore occur above the prospecting tunnels that have been driven through the ore bodies. There is now no evidence as to the shape of the keel of the syncline, whether it narrows to a knife edge, is symmetrical, or is bulbous in section. All are possibilities. Moreover, there is only indirect and unrealiable evidence as to the depth of the keel below present prospecting. Although a geologist may be quite sure that important tonnages of high-grade ore exist at depth, he has hopelessly inadequate data as to the magnitude of these reserves; possibly there might be only 10 million tons or so, equally possible there may be four or more times this amount. The Conceição area is one of the better prospected areas; most of the others are so poorly prospected and exposed that not even the alternatives can be known.

Estimates as to percentage of the various ore types in an ore body from exposures are even more unreliable than tonnage estimates; only by mapping on such scales as 1/20 and 1/50 can inferences be made, for usually only the high-grade hard ore crops out.

Another type of high-grade ore present to an unknown extent in the Minas Gerais area is rather soft micaceous blue hematite, quite coherent but extremely friable. The specularite

**Data on the actual reserves of high grade ore in the Minas Gerais region is hopelessly inadequate. Less than 200 million tons has actually been proved, though far more is probably there. Funds should not be invested and transportation plans made on present guesses as long as deposits can be proved at reasonable expense.**

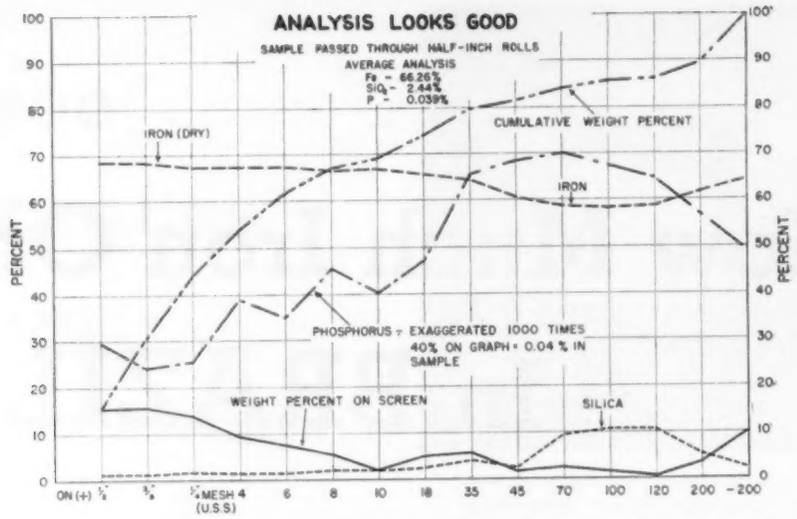
ANALYSIS LOOKS GOOD
SAMPLE PASSED THROUGH HALF-INCH ROLLS
AVERAGE ANALYSIS
Fe - 66.26%
SiO2 - 2.44%
P - 0.039%
IRON (DRY)
CUMULATIVE WEIGHT PERCENT
IRON
PHOSPHORUS - EXAGGERATED 1000 TIMES
40% ON GRAPH = 0.04 % IN SAMPLE
WEIGHT PERCENT ON SCREEN
SILICA
PERCENT
ON (+) ½ ¾ MESH 4 (U.S.S) 6 8 10 18 35 45 70 100 120 200 -200

FIG. 2—Screen analysis of 300 lb grab sample of fines discarded in mining at Cave Peak, Itabira District. (See Part I, The Iron Age, Aug. 17, p. 84.)

Brazilian Iron Ores

*Continued*

crystals are larger than in the average ore and the material has a greasy feel. Ore of this type is known at the Andrade property of Companhia Belgo-Minera, where it is crushed and sintered for use in the blast furnace, and in the Itabira district on the properties of Companhia Aços Especiais de Itabira.

### Lower Grade Ores

There are various types of lower-grade ore in the Central Minas Gerais area of Brazil. Among these are canga, chapinha, and other leached iron formation, and the true iron formation, itabirite. As used here, low-grade ore refers to material below 66 pct Fe (dry). This is not as arbitrary a division as appears at first glance, for there seems to be a natural break between ores of 66 pct Fe and over and ores with 62 to 63 pct Fe and under, with relatively few deposits between.

### Great Tonnages Assured

With the exception of itabirite, these materials are all characterized by considerable amounts of hydrated iron oxide, by great porosity, and, usually, by erratic phosphorus and iron analyses. They are all related to surface weathering of ferruginous rocks and therefore are of limited vertical range, possibly no more than 150 ft. An areal extent measured in tens of square miles assures great tonnages of the material. Only one such deposit has been explored to appreciable depth; this, a deposit of leached iron formation, was calculated to contain 300 million tons of material containing around 66 pct Fe and was of non-bessemer grade.

These ores are structurally weak, are usually quite friable a short distance below the surface, and absorb much water during the rainy season. Their high porosity makes them easily reducible and they are excellent ores for charcoal and, if composition could be controlled, for other blast furnaces. Judging from samples of ore seen from Cerro Bolivar, in Venezuela, the Venezuelan deposits seem closely related to some of these superficial ores.

### Itabirite—Basic Ore Type

The original metamorphosed sedimentary iron formation from which all the other ore types were derived is known as itabirite. Though locally it is contaminated by talc, amphiboles, and other minerals, typically it consists of alternate layers of specularite and granular silica ranging from less than a millimeter to more than a centimeter in thickness. It is probably a more highly metamorphosed equivalent of the relatively unmetamorphosed jasper-hematite iron formation of our Lake Superior region and of the Urucum region in Mato Grosso, Brazil.

Itabirite is usually capped by canga. Beneath the canga cap the itabirite is commonly hydrated and soft. It can be dug out with a shovel, and the fine granular quartz separates easily from the platy iron oxide. At widely varying depths below the canga, but usually less than 100 ft, hydration of the iron becomes subordinate and the itabirite is a slightly coherent laminated rock composed of granular quartz and specularite. In some cases the zone of hydrated itabirite is completely or almost completely missing; on the other hand, bands or zones of hydrated itabirite at depths of several hundred feet can be cited.

Extremely hard and tough itabirite also occurs abundantly. This rock, usually leaner than the softer itabirite, crops out well and forms many spectacular crags. Whether hard itabirite is merely an unweathered phase of the more commonly encountered softer itabirite or whether it has been silicified and/or otherwise altered during metamorphism cannot yet be affirmed.

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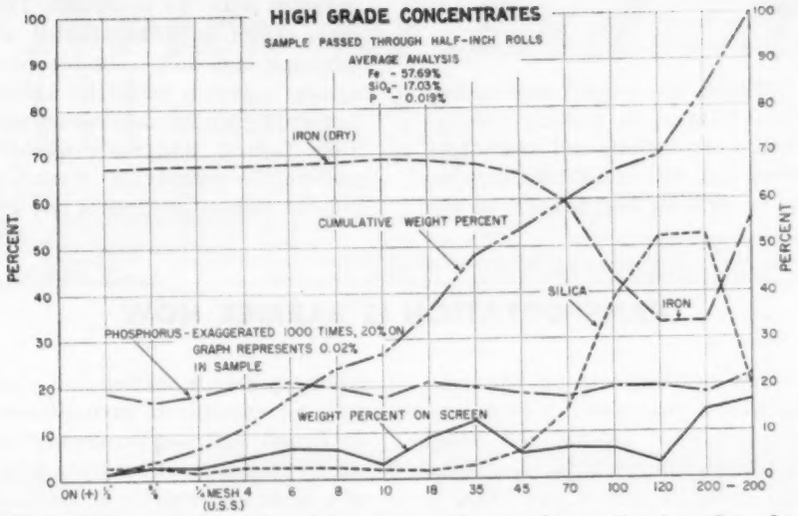


FIG. 3—Screen and chemical analyses of a sample of Itabirite taken from Cave Peak, Itabira District.

## Soft Itabirite Concentrates Easily

The soft itabirite assumed definite economic interest after preliminary tests carried on in the laboratory of the Instituto de Technologia Industrial of the state of Minas Gerais. These tests, made at the request of Gilbert Whitehead, superintendent of mines of the Companhia Vale do Rio Doce, proved that the material can be concentrated without difficulty by a Humphrey Spiral to 67-69 pct Fe. The first test work was carried on under the direction of Dr. Hubert Pinagel of this company. Cheap concentrates can be made because the only costs lie in providing a water supply, the simple equipment, and in tailings disposal. Large tonnages of soft itabirite must eventually be moved in the course of mining the purer ores.

Data on grade of the soft itabirite are still inadequate. Most samples hitherto taken have been from surface pits and trenches. Many of the old tunnels in the Itabira District cut soft itabirite at depth, but they were not adequately sampled and are now caved. On the basis of meager sample data now available, it is assumed that soft itabirite in the Central Minas Gerais region will average between 46 and 52 pct Fe, with large tonnages of material available that will average more than 52 pct Fe and smaller though still appreciable tonnages, particularly in some districts, averaging more than 55 pct Fe.

Fig. 3 shows results of the screen analysis of a sample of above-average itabirite and also chemical analyses of the screen fractions. The concentration of silica in the range between 70 and 200 mesh and of iron in the plus 70-and minus 200-mesh fractions is typical. A moderately pure plus 45-mesh concentrate could be made by screening alone.

Any estimate of potential tonnages of itabirite available for concentration must wait on solution of the geologic problem of the relation between hard and soft itabirite as mentioned above. Hard itabirite is a tough material to drill and crush, and costs therefore would be so high that exploitation is economically out of the question for many generations. Mapping of the distribution of itabirite must also be completed, and many structural problems solved. However, more than 200 miles of itabirite outcrop are known; apparent thickness of the formation ranges from a few feet to more than 3000 ft; the formation undoubtedly is continuous under several hundred square miles of overlying rock; that locally itabirite is known to be soft to depths of 300 ft or more. In short, if the economic and technical problems of using the iron in soft itabirite could be solved, there would be no shortage of supply for many decades at any conceivable rate of exploitation.

## Potentialities Are Great

The reader will undoubtedly be struck more by our present ignorance of Brazilian iron ore resources than by our present knowledge of them. The intent of the foregoing pages has been to emphasize the great potentialities of the Central Minas Gerais area as a future source of iron ore.

The cooperative program now going forward between the Brazilian Departamento Nacional da Produção Mineral and the U. S. Geological Survey under the auspices of the Dept. of State will, it is hoped, do much to clarify the picture and to supply enough quantitative data to serve as an adequate foundation for more detailed investigation of individual deposits by private or public capital. Topographic base maps of about 4000 square miles are being prepared, the Brazilian Government is obtaining air photos of the entire region to serve as a base for topographic and geologic mapping, and the Conselho Nacional de Geografia, in cooperation with the Pan American Geodetic Survey, is running a first-order triangulation net through the area

for control. In addition, the Departamento Nacional da Produção Mineral is drilling for information on ore and ore bodies, and local companies are spending and will spend considerable sums prospecting by drilling and tunnels in cooperation with the program. The geology of the whole region is to be studied with the hope of obtaining not only valuable economic data but equally valuable scientific information. In all this work cordial cooperation exists among Brazilian federal and state agencies, private and semi-public companies, Brazilian and foreign, and the Survey engineers and geologists.

## TRANSPORTATION IS BARRIER NOW

Were Brazil's iron ore deposits on the seaboard, millions of tons a year would now be exported. They are, however, located 200 miles and more inland, behind formidable mountain barriers over and through which less than a million tons of ore trickled to the coast last year.

The ore region has two natural outlets. The eastern part, which may contain between one-third and one-half of the available ore reserves, is drained by the head waters of the Rio Doce, which reaches the sea northeast of Vitoria. The present railroad, the meter-gage Vitoria é Minas, leaves the river system near its mouth and crosses a mountain range to reach Vitoria, the shipping point. The port of Vitoria cannot handle ships of more than 10,000 tons and is therefore unsuitable as a large-scale loading point, which would demand facilities for ships of 20,000 tons or more. An adequate port site is available at Santa Cruz, which would give a shorter railroad haul. This port site would also avoid the mountain range near Vitoria, resulting in a downhill haul all the way from the deposits, 325 to 375 railroad miles upriver.

The western portion of the iron-bearing region is tapped by the Central do Brasil R.R., owned by the government. This railroad crosses three mountain passes on the way to the coast. Present shipments are made from Rio de Janeiro, but other and better sites (Angra dos Reis or Mangaratiba) for a modern ore port exist southeast of Rio. The main line of the Central is broad gage (1.6 m), but part of the system in the iron area is meter gage. Parts of the western area, theoretically tributary to the Central, conceivably could ship via the Rio Doce Valley if adequate transportation were available there.

### Railroad Condition Hampers Output

Production of every mine now shipping ore for export is limited by the available railroad facilities. More ore could be mined, more could be sold, if it could be transported. Although the record of gradually increasing shipments from Vitoria demonstrates that the Vitoria é Minas Railroad is steadily being improved, the time when the planned capacity of 1,500,000 tons of ore per year will be reached is a matter of conjecture. Compared to the potentialities of the tributary area, a million and a half tons per year may be considered insignificant. The Central do Brasil Railroad is already overloaded, for it must not only haul ore but all the other products of a large and rapidly developing area. Exports of iron ore via this route are subject to so many variables and unknowns that no reasonable guess as to future increase of ore capacity can be made. Brazilian exporters and many Brazilian officials are keenly aware of the problem, but the solution, which evidently must satisfy both economic and political interests, has proved elusive. It is possible that an entirely new transportation system, restricted solely to ore transportation, may be the only answer.

### More Data and Transport Essential

In considering the future place of Brazil in world iron ore markets, two points seem certain. The first is that if Brazil is to assume its potential position as an exporter of iron ore, adequate knowledge not only of the Brazilian ore sources but also of the competitive ore sources for the world market must be available in Brazil. The precarious economic balance between Brazilian and competing sources must be understood there and positive efforts made to secure for that country its potential place, rather than letting that place go by default. There are adequate supplies of good-grade ore elsewhere in the world and, unless the cost of Brazilian ore on world markets is as cheap as, or cheaper than, it would be from these other sources, and unless a steady flow can be assured, these other ore sources will be used.

The second point is that without the investment of large sums in an imaginative, courageous, and strictly economic approach to problems of ore transportation and shipment, exportation at a rate that both appreciably alters the present world iron ore supply and provides Brazil with an important new source of foreign exchange is out of the question for many years. Such investments cannot be made, either by Brazilian or by foreign capital or, perhaps preferably, by a partnership of both, without reasonable assurance as to markets and as to costs.

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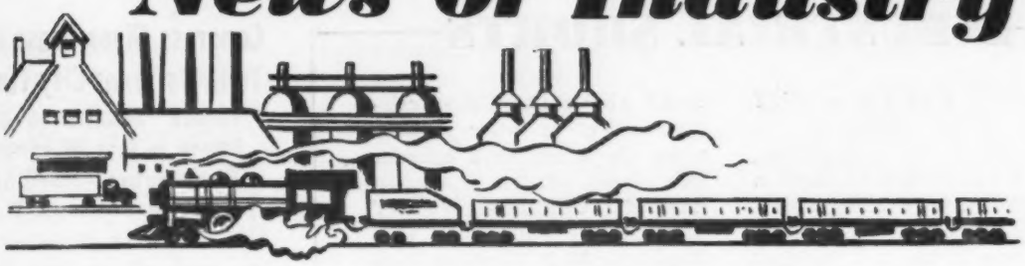
# News of Industry



## Boon to Expansion

New York—If industry is permitted to amortize defense plants in 5 years some present expansion plans will be expanded and some new ones evolved in several industries.

At a recent press conference Irving S. Olds, U. S. Steel chairman, indicated that the vast expansion projected by his company might be re-surveyed and possibly augmented were such a law enacted.

The new law could apply to the new Fairless works of U. S. Steel (near Trenton, N. J.), construction of which is scheduled to begin within the next few months. Minimum ingot capacity of 700,000 tons is planned, but it could turn out to be larger.

## Denies Purchase Report

**Pittsburgh**—An official of Penn-Ohio Steel Co. denies a persistent report that the company is negotiating for purchase of the Hudson Motor Co. hand sheet mill facilities at New Castle, Pa. It is understood that Hudson has installed stamping facilities at the New Castle plant, since it is closer to Pittsburgh district sheet suppliers.

## B & O Buys Budd RDC-1 Cars

**Philadelphia** — Two rail diesel cars have been bought from the Budd Company here by the Baltimore and Ohio Railroad for some of its Baltimore-Washington-Brunswick commuter runs. The self-powered, all-stainless steel RDC-1 units will replace steam-powered coach trains.

## Accelerated Plant Amortization Likely

**Would be included in interim tax-increase bill . . . May permit industry to write off defense plants in 5 years . . . Higher corporate taxes, shorter payments seen**—*By Gene Hardy.*

**Washington** — As Congress speeded the interim tax-increase bill toward likely pre-Labor Day enactment it appeared certain that one of the provisions of the bill would permit industry to write-off plant and facilities for defense purposes at a faster than normal rate.

### Includes Plants Now Built

While the Senate Banking Committee, after its deliberations on the Defense Production Act, suggested accelerated depreciation, Congress appears more favorably inclined toward approving a 5-year amortization of new defense plants and facilities, similar to World War II procedure.

This provision was approved by the Senate Finance Committee last week when it acted on the tax bill.

### Higher Corporate Taxes

The 5-year amortization would be authorized by means of certificates of necessity, applying to plants and facilities completed or installed after Dec. 31, 1949.

The new provision makes one major change from the earlier law. It does not permit amortization in less than 5 years under emergency conditions as was the case during World War II.

The interim tax measure, designed to raise an additional $5 billion, would also increase the top corporate rate 4 pct to 42 pct for 1950 and to 45 pct for later years. It also speeds up the payment of corporate income taxes so that at the end of 5 years all firms will have to pay their taxes within 6 months of the end of the taxable year. Present law spreads these payments over a full year.

The Senate measure cuts the period for holding capital assets from 6 months to 3 months in order to qualify as long-term investment. The carry-back and carry-forward provisions are also liberalized.

## To Build Openhearths in Italy

**Pittsburgh**—Loftus Engineering Co. will design, engineer and furnish special equipment for five 200-ton openhearth furnaces for the Finsider Co., Italian steel producer, under a $500,000 contract to be paid for partly by ECA funds. A Loftus representative will direct furnace construction in Finsider's Cornigliano works, near Genoa.

## Seeks to Extend Pipeline

**Washington** — Under an application filed with the Federal Power Commission, the Shenandoah Gas Co., of Lynchburg, Va., would build an additional 38 miles of 8⅝-in. pipe line and 11 miles of 4½-in. and 3½-in. line to serve three Shenandoah Valley cities.

# INDUSTRIAL SHORTS

**TRIPLE FIRED** — RUST FURNACE CO., Pittsburgh, will design and build a slab heating, triple-fired furnace to serve a strip mill of the Stanley Works, Bridgeport, Conn. Construction will begin in the fall. The furnace will have a capacity of 50 tons per hr.

**NEW FACILITIES** — A new building, providing 20,000 sq ft of additional production space, is now in operation at the main Plymouth, Ind., factory of JOHN MECK INDUSTRIES. Located near other buildings of the plant, the structure is being used for pre-production work and making of pre-assemblies.

**FOILED AGAIN**—Expansion of the operations of its foil division with the introduction of Kaiser Foil, aluminum household wrap for retail sales, has been set by KAISER ALUMINUM & CHEMICAL SALES, INC. First distribution of the packaged foil will be through retail stores in the Pacific coast area.

**TOOL COMPANY SOLD**—Sale of TUNGSTEN CARBIDE TOOL CO. by MICHIGAN TOOL CO., Detroit, to A. E. Tozer, general manager of the company since its founding in 1928, has been announced. Tungsten Carbide was one of the first companies in the U. S. to product carbide tipped tools.

**SILVER ANNIVERSARY** — Clarence B. Randall, president of INLAND STEEL CO., recently joined the ranks of the company's 25 year men. In addition to receiving a gold pin, he was presented with a framed letter, the same letter which Mr. Randall received in 1925 offering him a job with the company.

**PLANT PURCHASED**—A new plant at Smethport, Pa., has been acquired by HOUGHTON LABORATORIES, INC., for the production of protective coatings for the chemical, petroleum, plating and general industrial fields.

**FAST AND FURIOUS**—A celebration was in order recently when the 5 millionth cylinder liner came off the production lines of CAMPBELL, WYANT & CANNON FOUNDRY CO., Muskegon, Mich. All these liners have been centrifugally cast in the company's No. 6 plant which has been turning them out on an average of one million a year since it opened in 1945.

**LIST LEADERS** — Elected to head the northern California chapter of the American Foundrymen's Society for the 1950-51 term are: John R. Russo, RUSSO FOUNDRY EQUIPMENT CO., Oakland, president and chapter chairman; Philip C. Rodger, GENERAL METALS CORP., Oakland, vice-president and program chairman; Davis Taylor, AMERICAN WHEELABRATOR & EQUIPMENT CO., San Francisco, secretary; and Fred A. Mainzer, PACIFIC BRASS FOUNDRY CO., San Francisco, treasurer.

**CHANGES NAME** — CARTER PRODUCTS CORP., Cleveland, has changed its name to CARLON PRODUCTS CORP. The change, effecting only the corporate name, is in line with company policy to consolidate all products and facilities under one trade-name.

**ACQUIRES PLANTS**—SOLAR STEEL CORP., Cleveland, has purchased MILLER STEEL SALES, INC., Philadelphia. Solar Steel acquires the Miller plants in Philadelphia through the transaction and will operate them as the Philadelphia Div., stocking a line of general steel products.

**AUGMENTS HOLDINGS**—Purchased by ROYAL METAL CO., Chicago, is the DELUXE METAL FURNITURE CO., Warren, Pa., steel shelving producer. Purchase price was not disclosed, but the transaction involved all property of the DeLuxe firm, including land, buildings and equipment.

## Congress Gives Lease on Life To RFC's Texas City Tin Smelter

**Termed "essential to defense" . . . Passed in face of complaints.**

**Washington**—Heeding the warning of Sen. Johnson, D., Tex., that the U. S. tin stockpile was "not in good shape and that output was not nearly what it should be," Congress and the White House termed the RFC-operated tin smelter at Texas City, Tex., as "essential to national defense" last week and ordered that it continue to process low-grade Bolivian ores for another 5 years.

### Opposition Downed

Congressional arguments to write protection for the domestic industry into law were defeated. A number of congressmen said that new processes developed by the Vulcan Detinning Corp. required RFC to show "due regard to the public interest in the maintenance of domestic smelting."

Sen. Johnson urged Congress to "move with the greatest speed" in getting as much tin as possible from the Far East for the stockpile. He stated that the U. S. needs all the tin it can get from domestic and foreign sources.

The RFC smelter has been producing about 35,000 tons of tin annually and total production in 8½ years of operation is 274,735 tons. Its peak production year was 1946 when 43,468 tons were refined.

## Arctic Circle Slag Fumer To Reclaim Zinc, Lead from Residue

**New York**—A slag fuming installation near the Arctic Circle will feed on an 800,000-ton smelter residue containing about 26 pct zinc alone but discarded previously as commercially useless. The recovery plant is now being installed at the Hudson Bay Mining and Smelting Co., at Flin Flon, Manitoba, 600 miles above Winnipeg, Canada.

Introduced during World War II and furthered since, slag fuming recovers nonferrous metals



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from the residue of normal smelting operations. Three installations of slag fuming equipment have been made in North America during and since the war, said D. V. Sherban, engineer of Babcock & Wilcox Co., which has worked with the smelting industry in the recent development.

Zinc or lead is fumed up in vapor form from the surface of a furnace-load of molten slag and is converted into metallic oxide or powder. The first slag fumer was built in the Kellogg, Idaho, plant of the Bunker Hill and Sullivan Mining Co. The second went up in the El Paso, Tex., plant of the American Smelting and Refining Co., and the third at Flin Flon.

# Auto Assembling in California on the Rise

**About 10 pct of U. S. autos, light trucks to be assembled in Los Angeles, San Francisco Bay area plants in 1950 . . . Parts buying rises**—*By Robert T. Reinhardt & Herbert G. Klein.*

**San Francisco**—At current production and assuming no serious curtailments of materials or manpower arise, 12 automobile assembly plants in California will produce this year approximately 10 pct of the nation's automobiles light trucks according to a survey just completed by THE IRON AGE.

For the first 6 months of 1950 seven different companies produced approximately 373,000 machines, and estimates by the manufacturers and THE IRON AGE indicate a total production for the year of approximately 798,000 units. During 1949 total production approximated 594,000 autos and light trucks.

### K-F Enters Scene

Only new factor in assembly in the West during the past year is the Long Beach plant of Kaiser-Frazer Corp. which anticipates an annual production for this year of approximately 2500 Kaisers. This operation began late in 1949 and produced about 500 units that year. Another plant of similar size will be in operation in Portland, Ore., in September, producing Kaisers and possibly the "Henry J."

Nash has increased production facilities at its El Segundo plant and its anticipated total for this year is 28,000 units as compared with 15,000 produced in 1949. General Motors is expanding its Southgate plant by 250,000 sq ft.

### Parts Buying Rises

All companies assembling automobiles in the West are continuing to increase purchase of parts and components locally and Ford alone is expected to spend about $63 million in the West this year. Chrysler anticipates its western purchases will total about $40 million. Ford has about 45 western suppliers who make about 650 different parts for the Ford and Lincoln cars assembled here. Parts buying in the West by all companies will approximate $250 million this year.

Principal components purchased in the West include tires, springs, bumpers, wheels, radiators, paints, upholstery material and nuts and bolts. Incidentally, in 1949 about 900,000 tons of automobile parts and approximately 200,000 tons of complete automobiles were shipped into the West.

As production of cars in the West continues to increase, the day draws closer when some of the larger stampings will be produced there although informed sources believe such operations are not in immediate prospect.

## ASSEMBLY OF AUTOMOBILES AND LIGHT TRUCKS IN CALIFORNIA

| Manufacturer | First Started Production | Name of Auto | Actual Production '49 | Actual Production First 6 Months of 1950 | Estimated Production for All of 1950 | Number of Employees |
|---|---|---|---|---|---|---|
| **Chrysler Corporation** | | | | | | |
| Los Angeles | 1932 | Chrysler, Plymouth, Dodge, Desoto | 135,000* | 50,673† | 160,000* | 3,112 |
| San Leandro | 1948 | Dodge, Plymouth | | | | |
| **Ford Motor Company** | | | | | | |
| Long Beach | 1930 | Ford | 49,941 | 38,508 | 77,000* | 1,200 |
| Los Angeles | 1947 | Lincoln, Mercury | 26,238 | 20,519 | 40,000* | 1,000 |
| Richmond | 1931 | Ford | 65,876 | 41,350 | 76,350 | 1,617 |
| **Kaiser-Frazer Corporation** | | | | | | |
| Long Beach | 1949 | Kaiser | 500 | 1,142 | 2,500* | 124 |
| **General Motors Corporation** | | | | | | |
| Southgate | 1936 | Buick, Oldsmobile, Pontiac | 281,920 | 180,768 | 380,000* | 6,800 |
| Van Nuys | 1948 | Chevrolet | | | | |
| Oakland—Plant 1 | 1916 | Chevrolet | | | | |
| Plant 2 | 1936 | Chevrolet | | | | |
| **Nash Div. Nash-Kelvinator Corp.** | | | | | | |
| El Segundo | 1948 | Nash | 15,000 | 16,000 | 28,000 | 800 |
| **Studebaker Pacific Corporation** | | | | | | |
| Vernon | 1935 | Studebaker | 33,760 | 20,810 | 46,000 | 1,200 |
| **Willys-Overland Motors** | | | | | | |
| Maywood | 1929 | Willys | 5,638 | 3,166 | 8,000* | 325 |
| | | Current Totals | 593,873 | 372,926 | 797,850 | 14,361 |

† Production to July 27, '50. Chrysler's 100-Day Strike accounts for this low production.
* Estimated by IRON AGE

## Seeks to Build New Power Plant

**Birmingham**—The Alabama Power Co. has asked the Alabama Public Service Co. for permission to issue 100,000 shares of new preferred stock to build its seventh unit of 100,000-kw capacity at its Gorgas, Ala., plant. A sixth unit is under construction. Reason for the request was the "tremendous development in Alabama."

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# British Steel Recovers for Defense Role

**Steelmaking at record . . . Industry seen able to carry burden of $9 billion defense program . . . New capacity keeps coming in . . . Details of postwar expansion program listed.**

**London**—The British steel industry, battered by Nazi bombs and run to the hilt during World War II, staggered into the postwar period but through judicious rebuilding, replacement, and expansion made a comeback. Steelmaking now is nudging aside past records and the industry is confident that it can bear the burden of the government's proposed $9 billion defense program.

### Impressive Upsurge

Production in the first half of 1950 was 8,309,000 long tons, an upward bound of 360,000 over the former record half. Output climbed even in vacation-ridden July which had an annual production rate of 14,366,000 long tons as compared with 12,697,000 in July '49 and 13,145,000 for the record production month of July 1940.

The increase of the first half of '50 over the first half of '49 was 722,000 long tons, and it is significant that the jump of this July over July of last year is about double the rate. It points to new capacity coming into production—under an expansion program that steelmen believe will lead to a total capacity of 17 to 18 million long tons annually.

Production at the hot strip mill at Margam, South Wales, should begin its full production phase in the second half of 1951 while the Trostre finishing plant will make a large contribution of cold-finished sheet and tinplate at the same time. Current shortages of sheet and tinplate will be much allayed.

### Rolling Capacity

Margam's new melting shop will have an annual output of 1,500,000 tons of ingots a year, of which 1 million tons will feed the continuous strip mill. Some 20,000 tons of rolled strip, sheet, and plate will later supplement the present weekly output of 46,500 tons a week—probably at a fortunate time for the rearmament program.

The integrated steelworks at Margam with sheet and tinplate mills will cost about $168 million. To be completed in 1952, it will produce 300,000 tons of finished sheet and 350,000 tons of tinplate per year.

Blast furnace additions include three at the Consett Iron Works in County Durham and another at Colvilles Clyde Iron Works. Finishing touches are being put on the blast furnace of the Margam Works of the Steel Co. of Wales and it will be blown in soon.

### Coke Oven Building

Important factors in expanding steel output are a new ore preparation and handling plant at the Tees-side works of Dorman Long and preparation plants at Corby and Scunthorpe. Dorman Long has rebuilt its coke ovens while at Consett a coke oven battery has been replaced.

The Richard Thomas mill and Baldwin's Ebbw Vale plant have installed an openhearth and an electrolytic tinning plant, respectively. Steel melting capacity has been boosted at Round Oak, Appleby-Frodingham, Dalzell, and Corby. The Shotton strip mill has also been expanded and tube making facilities of Corby and Scotland have been enlarged. Darlington received a new section rolling mill.

Sheet, tinplate, terneplate, and blackplate are still under distribution control and licenses or authorization are needed for use and export. Pig iron and scrap are still tied to license control but despite the looming defense spending it is likely that all steel will be freed by 1951 or '52.

FIRST STEP: Workmen reinforce the foundation of the new blast furnace soon to be blown in at Margam, England.

## Baldwin to Build Patton Tanks

**Philadelphia**—Gen. Patton M-46 tank hulls will be produced by the Baldwin Locomotive Works, Eddystone, Pa., under the second major tank order awarded by Army Ordnance in recent weeks.

Baldwin will continue its World War II role as an armaments producer with the expected reactivation of its tank manufacturing operation in early September.

# A. O. Smith-Sheffield Pipe Plant Speeds Up Production

**Houston**—With the Federal Power Commission rubber-stamping approvals on pipeline building applications at a volume not anticipated, the A. O. Smith and Sheffield Steel plant here has made an opportune entrance into production of large diameter welded steel pipe. Its presses, dies, and flash welders are quickening output momentum to reach an expected 40,000 tons of pipe per month by this October. (THE IRON AGE, Aug. 17, 1950, p. 106.)

Equipped at present to turn out pipe in sizes from 16 to 36 in., with plans to lower pipe size range later to 85/8 in., the Texas plant is now making 1000 miles of 30-in. pipe for the Texas-Illinois Pipe Line Co.

A hot bath in a vat containing heated sulphuric acid awaits plate shipped here from the nearby Sheffield Steel mill. Massive cranes muscle loads of 40-ft plates into the solution for chemical cleaning or pickling.

After trimming, the plate moves into the U-ing press which slams down and shapes it into a wide and shallow "U." Further down the line, the plate goes into a crimping press. Powered by irresistible hydraulic strength, a blunt blade plunges into the plate's center and it becomes egg-shaped.

In the strict unyielding confines of a cylindrical die with the pressure of a gigantic press, the egg-shaped plate loses its last claim to flatness and emerges as a cylinder with a slim gap down its back.

In the flash welder the 40-ft cylinders are electrically brought to white heat. When pressure is applied to close the gap, the metal fuses with a bright glare. Prettied up, the pipe is complete. It then goes into temporary storage and is loaded into freight cars as 30-in. pipe for the Southwest's natural gas industry.

CHANGE TO EGG-SHAPE: After pickling and being pressed into a wide, shallow "U"-shape, the plate moves into a crimping press as shown in the photograph and with a sudden whack is egg-shaped.

STILL ANOTHER SHAPE: When the dies close on the egg-shaped plate it is transformed into a cylinder. At the left an "egg" awaits the treatment while its fellow is shown already formed in the jaws of the press.

SUDDEN GLARE: Soon to become a 30-in. pipe, a cylinder is fitted into the flash welding unit, is electrically brought to white heat. The gap running down the cylinder is narrowed and fused.

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## TCI Sales Training Program Goes into Mines, Mills, Office

**Intended to meet peacetime competition . . . Men can't get acid test.**

**Birmingham**—Future salesmen of the Tennessee Coal, Iron and Railroad Co. in the Sales Training Program have wandered through coal caverns, watched steelmaking, and listened in as business was transacted in the Sales Dept. They were being taught their products and procedure from below the ground up—but now that they are intimate with what they must do and sell, they cannot prove their mettle.

With unrelenting consumer demand continuing and defense spending imminent, TCI like other mills must dole out its steel while its high-calibre salesmen find order-getting all too simple. The program opened shortly after World War II when industry reasoned that a trained, livewire sales force was needed to meet peacetime competition.

### Three Phase Course

TCI started with the premise that a salesman needs more than a winning smile to get peacetime orders. The program was designed to give him a grassroots insight into sales policy and a good knowledge of his products. Guided by C. M. McKenna, manager of sales training and procedure, one or two courses of 12 students each are held every year.

In the first phase of the course, trainees get basic training, observing actual production and learning procedure of sales orders and sales departments. Actual work at sales clerical work comprises the second phase. Trainees shadow established salesmen in the third and final phase.

## Asks Funds for Manganese

**Washington**—President Truman has asked Congress for $850,000 to increase domestic manganese output. At present, the domestic industry supplies less than 10 pct of requirements, of which nearly all comes from Anaconda properties in Montana. Some $600,000 of the requested funds would be used to build a pilot plant for beneficiation of low grade ores from Arizona's Artillery Peak deposit.

The remaining $200,000 would be allocated to the Bureau of Mines for additional research into the recovery of manganese from slag. Slag contains roughly about 10 pct manganese, the Bureau estimates, and the work done so far is described as encouraging. The White House says, presumably on Bureau of Mines authority, that development of a good recovery process would increase manganese supply by about 250,000 tons annually.

## Begins Gas Turbine Production

**Schenectady**—Acclaimed by some as the power plant of the future, gas turbines are going into large-scale production at the General Electric Co. plant here. The plant is now being equipped to the tune of $4 million.

## Order Backlog Prompts Expansion

**Jackson, Mich.**—With unfilled orders over $2 million, about double those of last year, Aeroquip Corp., here, will add 55,000 sq ft of manufacturing floor space to its plant at a cost of $500,000, reports Peter Hurst, president. Further expansion is expected with increased orders for military aircraft. The firm produces Flexible Hose Lines and fittings.

## PEI Cancels Cleveland Conference

**Washington**—Since the turn of world events has shifted industrial emphasis from sales methods to how peacetime production will be affected by the defense program, the Sales and Management Conference of the Porcelain Enamel Institute scheduled for Oct. 5 and 6 in Cleveland has been cancelled.

The PEI executive committee said that the conference would have stressed planned promotion in creating wider markets and would be inappropriate now.

## International Harvester Rites Dedicate First Research Unit

**To conduct research, train supervisors . . . Total cost, $1,200,000.**

**Chicago**—The first unit of International Harvester Co.'s new $1,200,000 research foundry was dedicated last week at rites held in the firm's research building here. Although its primary purpose is to conduct technical research, the foundry will serve as a training ground for supervisory personnel.

MOLTEN BAPTISM: The first heat of International Harvester's first unit of its $1,200,000 Chicago research foundry is poured into ingots on dedication day by John L. McCaffrey, president.

The second stage foundry construction will begin immediately and be completed in 1951. Present facilities will be greatly enlarged. Research will be centered on development of improved castings techniques, and improvements in working conditions, casting quality, and foundry efficiency.

The first stage foundry melting department contains a 1000 lb per hour direct arc electric furnace with auxiliary equipment capable of producing four tons of melt a day. Also installed were a

molding sand preparation unit with molding machines, core department with muller, core machines, core blower, and core ovens, cleaning department with tumbling, shot blasting and grinding facilities.

The foundry lab is equipped to run tests on sands, binders, and core mixtures at room and elevated temperatures and has physical testing equipment for transverse and tensile plus hardness tests. A pattern shop makes wood patterns and has facilities for gating and modification of metal patterns.

Housed in the same building with ten other sections of the research department, the foundry can thus get the services of related sections. The second stage foundry will add a cupola and be completely mechanized. First stage equipment will be augmented. Mechanical handling equipment for raw materials, molten metal, prepared molding sand, etc., will be added.

With completion of the entire program, the research foundry will be able to produce experimental castings in practically the entire size and weight range of company divisions. Daily melting capacity will rise to 25 tons.

# Inventory Controls—Few Hardships Seen

**President expected to institute controls . . . Firms strive to allocate fairly . . . Scare buying starts chain reaction . . . Controls to discourage speculative buying**—*By Bill Packard.*

**New York** — Among the first steps expected from the President following passage of the control bill is inventory control. While they aren't saying so publicly, this step will be welcomed by a good many sales executives who have been struggling with the task of allocating their products fairly without making good customers sore. This is true of nonferrous metals as well as steel.

Those who had experience during the last war, either in industry or in Washington, point out that the confusion didn't begin to clear up until inventory controls were established. Some companies were trying to order steel and other materials for immediate delivery to cover an entire order or program, delivery of which was scheduled to extend for many months. It didn't matter when they expected to actually use the material in fabrication; they wanted it all right away.

The same thing is happening today. Of course, added to this is a good-sized wave of industrial buying touched off by scare buying at the consumer level. These depleted stocks are being replaced all the way down the line. Each growing backlog of orders causes new orders to be placed with suppliers.

There is strong sentiment, even in the ranks of industry, that inventory control is needed to make any system of material allocation work. If a manufacturer's steel inventory grows to above normal he gets less tonnage the next month to bring his inventory back in line. But probably more important is that inventory control tends to discourage speculative buying just because an item is scarce—even though it may not be actually needed for some time. Why try to build a big stock if it only means a smaller quota next month?

"Indeed, Mr. Wilson, I am very pleased to make your acquaintance."

### Anger to Mirth Reactions

Mention inventory control to a number of manufacturers and you will get reactions all the way from anger to mirth. The truth is that many manufacturers have been striving for nearly a year to rebuild their inventories, and some of them haven't had much luck. As far as some firms are concerned inventory control will mean additional paper work, and nothing more.

In some cases materials have been fabricated and shipped out as finished goods faster than they could be replaced. Still the new orders have kept coming in.

It is true that consumers have had several weeks in which to scramble for existing supplies of scarce materials. And some of them may have been able to build inventories higher than normal. But not many of them. Industry has forestalled this to a large extent by carefully screening and policing orders. But the job has been as thankless as it has difficult, and a lot of sales executives will be glad to be taken off the hook.

## To Build Ingot Mold Plant

**Chicago**—In an attempt to overcome freight rate increases the Vulcan Mold & Iron Co., Latrobe, Pa., will build a $1 million plant in the Chicago industrial area for the manufacture of all types of ingot molds and accessories.

Construction of two buildings will start in September and the project is expected to reach completion in April, 1951. They will be able to accommodate two 108-in. cupola furnaces, 60-ft runways for 40-ton cranes, and equipment for making stools, inserts, cast iron hot tops. The plant, to be located in Lansing, Ill., will produce about 50,000 tons a year.

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## The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

### *Doubletalk*

WE have referred before to the unquestioned talents of the government for doubletalk and hypocrisy. Nowhere is this better illustrated than in the current official criticism of hoarding. The action of housewives in filling their attics with sugar and their bureau drawers with nylon stockings is hardly flattering, either to their intelligence or patriotism.

The point that this action creates the vary scarcities which permit the profiteer to flourish and make price advances almost inevitably hardly needs to be stated. Particularly stupid has been the rush for sugar of which this country has in sight for the next year a larger supply than we have ever before consumed in any 12-month period.

It is a pity, however, that this censorious reprimand to foolish consumers could not have been administered by parties in a better moral position to make them. For the plain fact is, that the government, which presumes to read its citizens a lesson on the error of hoarding, is itself the very worst offender.

Since the end of the war it has spent some $4 billion of the taxpayer's money in order to buy and hoard, i.e. keep out of the market, huge quantities of farm products. The object—to raise market prices and increase the cost of the consumer's groceries. Only recently the Commodity Credit Corporation, the government agency charged with the duty of keeping the cost of living high by removing surplus supplies from the market, appealed to Congress for another $2 billion. It got the two billion.

Since the beginning of the fracas in Korea, both the Senate and the House have been given opportunities to place these huge stocks on the market in order to check the rise in prices about which they professed to be so alarmed. Both houses turned the proposal down by overwhelming majorities.

One of the reasons why the extra two billion was needed was to build additional storage facilities in order to permit the government to hoard more of the things which were going up in price.

Meat ranks high in the list of items whose increase in price has aggravated the housewife. Throughout the corn belt every farmer watches the corn-hog ratio to determine whether corn should be sold in the form of grain or in the form of pork. As the price of corn is pushed up, whether by public demand or through government hoarding, the incentive to feed hogs diminishes. The same consideration operates upon the cattle rancher and feed lot operator. The price of corn directly determines the amount of meat which will be produced. By hoarding corn, the government cuts the supply of available meat and raises the price of ham and hamburger.

Does Uncle Sam acknowledge his responsibility as the culprit in the cost of living woodpile? By no means. He proposes instead to impose price ceilings at the retail level, to bring monopoly suits against highly efficient food store chains and place special taxes on "war profits."

The general mobilization bill which Congress is apparently determined to pass is simply a face-saving device for our statesmen to permit them to parade as the special guardians of the housewife's purse. At the same time they persist in a price support policy which is bound to continue the very evils they claim they are trying to cure.

## Union Stockyard Installs All-Stainless Steel Cattle Pen

**Cleveland** — Stockyard cattle soon to go to the abattoir will at least spend their few remaining days in the more comfortable confines of an all-stainless steel cattle pen recently installed by the Union Stockyard and Transit Co., Chicago.

Although the firm recognizes that stainless steel is an initially expensive product for pens, it aims to make the investment pay by reducing maintenance costs. The present wooden slat-type pens require a large crew while the stainless pens need negligible attention.

Stainless steel wire strung in tension across the sides of the pen affords "a remarkably unobstructed view of the cattle." Posts, fencing, gate, manger, water trough, and all fittings of the Union Stockyard pen are fabricated of Types 301, 302 Enduro Stainless Steel, made by the Republic Steel Corp., here.

## National Develops New Casing

**Pittsburgh** — A new deep well casing, tougher, stronger, and with a higher yield, has been developed by National Tube Co. Special facilities for its production have been installed. It is made from quenched and drawn steel having a far higher minimum yield strength than the present top standard grade of casing.

Depending on size, price of the casing, to be named "National Deep Well Casing," will range from $186 to $198 per ton.

## Soviets Ship Some Manganese

**Washington** — Including $600,000 worth of manganese and chrome ores, imports from Russia for June amounted to approximately $3 million, slightly below the monthly average for 1949. There were the first ore shipments to the United States from the Soviet since February when a token shipment was received.

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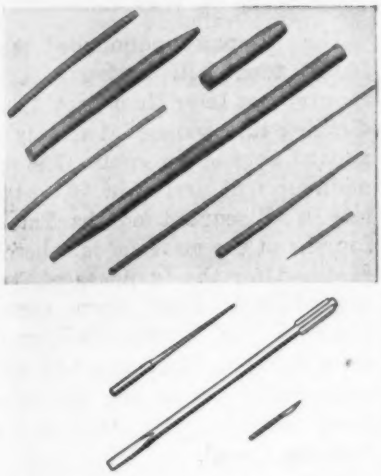

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## Marshall Plan Funds Approved To Rebuild War-Torn South Korea

**Washington**—Even while doughboys and Korean Reds are at deathgrips, Marshall Plan appropriations are being approved to rebuild war-devastated Korea after hostilities cease. More than $11 million has been approved through Aug. 5 since the war's beginning.

While some of the goods is now at Korean ports, some enroute, the bulk of procurements will come later to rebuild the South Korean economy. About $4.3 million will be used for railroad equipment, including $1.8 million for locomotives, about $250,000 for flat cars, and $500,000 for repair equipment. Another million will go for highway transport equipment, a half million for trucks and $250,000 for extra truck tires.

## To Build Western Pipe Plant

**Burlington, N. J.**—Another to join the industrial movement to the West, United States Pipe and Foundry Co. has started construction of a $2,500,000 plant on a 70-acre site in Decoto, Alameda County, Calif. With completion slated for the last half of 1951, the new plant will produce cast iron pipe contrifugally cast in metal molds.

General Donald Armstrong, president, said that the plant will be the first on the West Coast to produce centrifugally cast iron pipe and is being built to meet increasing demand in that area.

## Scrap Code Sent to England

**New York**—Following its recommendation to its membership to adopt nonferrous scrap metals specifications of the National Assn. of Waste Material Dealers, Inc., the Executive Committee of the National Federation of Scrap Iron, Steel and Metal Merchants, London, has received 100 copies of the code, reports Clinton M. White, managing director of the American Group.


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| 163 | 313 | 600 | 1150 | 1700 |
| 175 | 325 | 650 | 1200 | 1750 |
| 188 | 338 | 700 | 1250 | 1800 |
| 200 | 350 | 750 | 1300 | 1850 |
| 213 | 363 | 800 | 1350 | 1900 |
| 225 | 375 | 850 | 1400 | 1950 |
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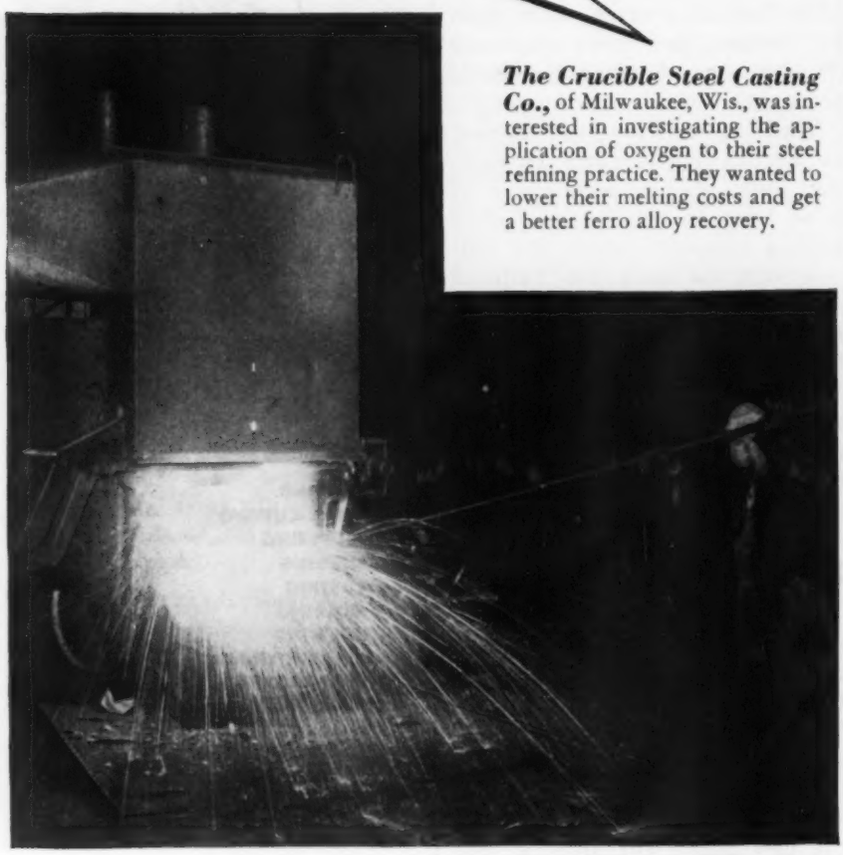
# Oxygen Refining lowers melting cost... permits better ferro alloy recovery... improves refractory life



***The Crucible Steel Casting Co.,*** of Milwaukee, Wis., was interested in investigating the application of oxygen to their steel refining practice. They wanted to lower their melting costs and get a better ferro alloy recovery.

***Clarence Nolan,*** Airco Technical Sales Supervisor, was called in to demonstrate the use of oxygen in refining acid steel. On his advice, a number of test heats were made in which Airco 99.5% pure oxygen was injected into the molten bath. These tests proved that substantial savings in heat time and power could be realized by adopting this method of refining. When the operation was put in general practice, it was found that in addition to the above savings, it offered better metal analysis control, improved refractory life and further savings through higher recovery of ferro alloys.

Additional savings were also enjoyed when the problem of handling and storing iron ore was eliminated.

For technical assistance or a copy of our folder "Oxygen In The Electric Furnace", please write your nearest Airco office.

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## U. S. Steel to Import 200,000 Tons of Scrap Steel in 4 Months

**Pittsburgh**—Ending some weeks of uncertainty, U. S. Steel Corp. has obtained release of European steel scrap and expects to import 200,000 tons of No. 1 heavy melting grade within the next 4 months for its eastern and West Coast operations. Originally this scrap was to have begun moving to the U. S. in mid-July. Bulk of the scrap will be from Germany and France.

### Some Scrap on Way

The company announced that 50,000 tons will arrive in this country not later than Sept. 1, indicating that some of it already is aboard ship or en route. The remainder will arrive in 50,000-ton lots in subsequent months. Three-fourths of the material is believed destined for the furnaces of Carnegie-Illinois Steel Corp. operations in the Pittsburgh-Youngstown district. The remainder will presumably go to the Columbia Steel subsidiary by way of the Panama Canal.

Delivered price of the foreign metal is said to be competitive with the current mill delivered price here. The company pointed to its original announcement to this effect early this summer.

## House Votes Ships to Great Lakes

**Washington**—The House has approved a bill which would permit the sale of ten war-built reserve fleet vessels for Great Lakes service. Provision to add surplus ocean-going ships to the Great Lakes transportation fleet was made after the House took official note that World War II shipbuilding activity benefited the salt water operator but was almost an empty promise to Great Lakes ship owners.

The bill would make available to Great Lakes operators vessels usable in Lakes trade at out-of-pocket cost, substantially similar to that which an ocean operator would pay for a ship.

## Flying USW Top Officers Break Up Ore Miner Picket Lines

**Birmingham**—A flying contingent of top crust officers of the United Steelworkers of America dissolved iron ore miners' picket lines that last Thursday shut down all steel mills of the Tennessee Coal, Iron & Railroad Co. at its Ensley and Fairfield plants.

### Give Cause for Strike

A meeting of ore mine officials, company men, and the union trouble shooters from Pittsburgh lasted several hours. On Friday morning no pickets appeared. Most of the workers were expected to go back to work last Monday.

A spokesman of the wildcat strikers said that between 4000 and 4500 ore miners walked off the job because the company refused to "bargain in good faith" over job qualifications that would have meant pay rises of from 9¢ to 13¢. The company rested its case on the no-strike clause in its labor pact and R. E. Farr, director of District 36, USW, said that the strike was unauthorized.

A separate strike by 4500 coal TCI miners was also called last week and union leaders said that it was not a sympathy walkout. The coal miners were also expected back this week.

## Ore Consumption Increases

**Cleveland**—Consumption of Lake Superior district iron ore by U. S. and Canadian blast furnaces rose to 7,579,251 gross tons in July compared with 7,249,109 tons in June and 5,262,359 gross tons in July 1949, according to the monthly report of the Lake Superior Iron Ore Assn.

Cumulative consumption this year to August 1 was 47,425,250 gross tons, compared with 48,915,456 gross tons in the corresponding period of 1949. Iron ore stocks on hand at furnaces and Lake Erie docks on Aug. 1 totaled 24,107,874 gross tons, compared with 19,189,363 gross tons July 1, and 35,063,647 gross tons on Aug. 1, 1949.

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By keeping draw benches and machines supplied with wire as needed to keep production going at top speed, efficiency of workers has been increased. Moreover, the truck stacks coils 2 and 3 high, thus increasing existing storage capacity 40 to 50%. In addition safer and better working conditions have resulted, aisles are kept clear, and men have been released from heavy back-breaking handling jobs to productive work.

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## Maximum Steel Use in World War Was 22.8 Million Tons in '43

**Was 38 pct of total then but would be much less with capacity now.**

**New York**—While steel mills and fabricators, and the man who has put off buying a new refrigerator, are awaiting the full impact of war orders with bated breath, reassurances continue to emanate from Washington and the press that steel needs for defense will not dislocate the civilian economy.

More oil on troubled waters was spread by the American Iron and Steel Institute which last week announced that in 1943 a maximum tonnage of steel, 22.8 million net tons, went into direct war use. It was 38 pct of a total 59,906,000 tons of steel shipped.

Capacity since 1943 has swelled to over 100 million tons and continues its upward strides. In 1944, record steel production year, direct war shipments of steel were 19.9 million tons or 32.9 pct of all shipments. Percentagewise, these war bites into total production would be much less now, expanding production considered.

Producers of ordnance, projectiles and tanks received 9 pct of total steel shipped in the 52 months from the beginning of 1941 through April 1945. Five pct went for building defense plants, cantonments, bases and similar uses. Navy and commercial shipbuilding used 13 pct.

## Whitney-Apollo Buys Mills

**Pittsburgh** — Whitney-Apollo Steel Co., Apollo, Pa., has bought four mills—one high breakdown and three fully automatic finishing mills—from Detroit Steel Corp. It will produce about 5000 tons of hot-rolled sheets per month at Detroit's Portsmouth, Ohio, plant. Apollo will obtain its sheet bar from Detroit Steel which produces between 15,000 and 20,000 tons per month at Portsmouth. Apollo will operate the mills until Detroit Steel installs its new cold strip mill at Portsmouth, perhaps as late as the fall of 1951.

## Rail Strike Cuts Steel Output

**Cleveland**—Steps were being taken at press time to close the Cleveland steel plant of Republic Steel Corp., in anticipation of a strike called by the Brotherhood of Railway Trainmen on the River Terminal Railway, serving Republic's Cleveland plant. All blast furnaces and openhearths are down and 2 days' steel production has already been lost.

The strike, if confined to the 5 days indicated by the union, will mean a loss of more than 35,000 tons of steel ingots here. Republic is also forced to shut down some coal mines in the Pittsburgh area which normally serve the Cleveland plant.

The strike of the Elgin, Joliet and Eastern Railroad at Chicago will have a crippling effect on Carnegie Illinois Steel Corp.'s steel production in the Chicago district.

By last Tuesday morning at 4 a.m., ten of the firm's 12 blast furnaces and all but six of its openhearths were down at the Gary works. At South works, eight out of ten blast furnaces now operating and all 31 of the openhearth furnaces were down. Company officials estimate the loss at both plants will average 28,000 ingot tons of steel per day.

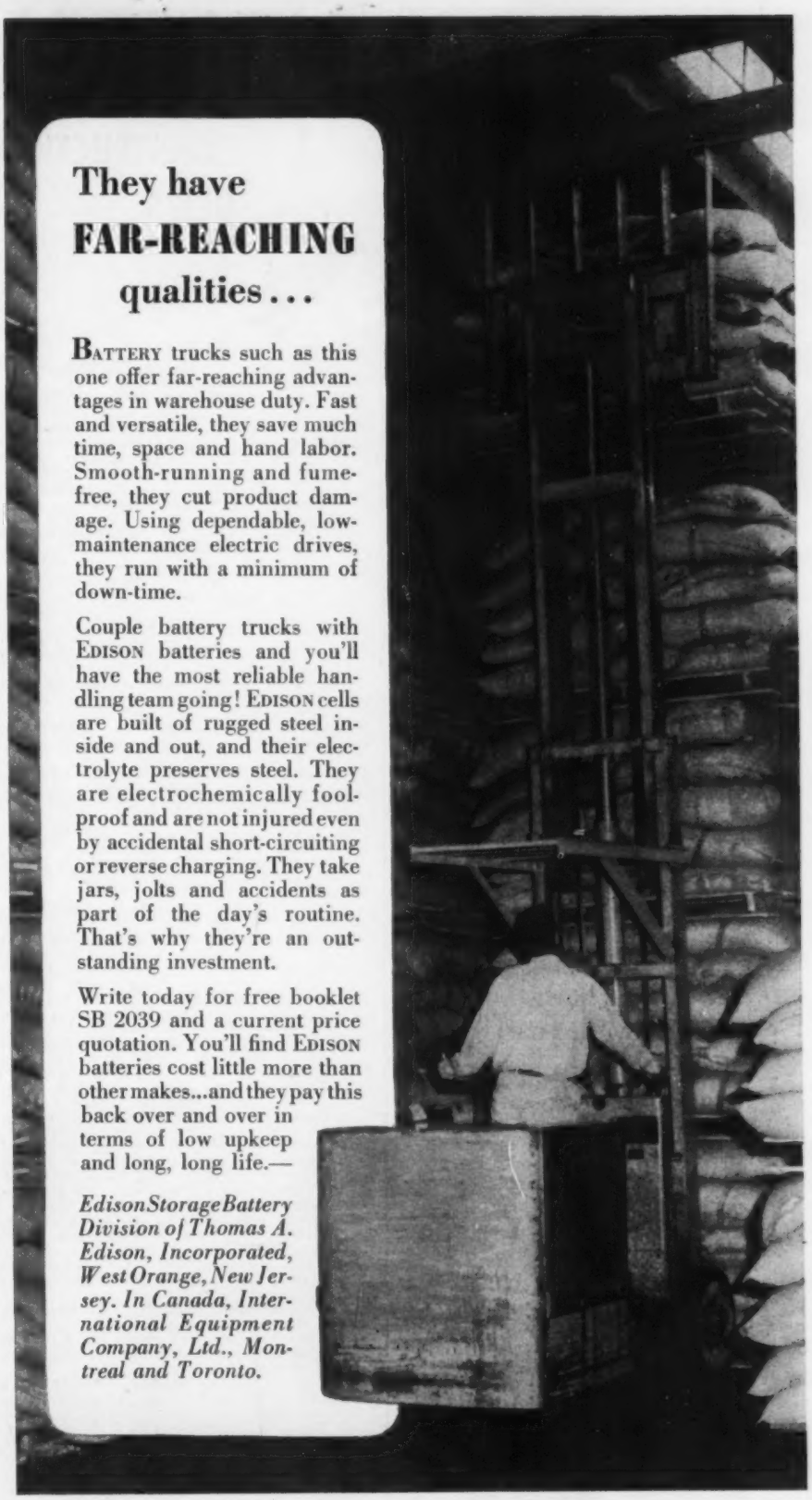
## New Clairton Ovens in Use

**Pittsburgh**—A new battery of 61 coke ovens capable of producing 300,000 tons annually is in production at the Clairton Works of Carnegie-Illinois Steel Corp., the sixth such unit built at the plant since World War II ended.

The new ovens also will produce some 14 million cu ft of by-product gas daily for use in district steelmaking operations.

## Kaiser Snaps Quarterly Records

**Oakland, Calif.**—Kaiser Aluminum & Chemical Corp. tallied sales of $76,246,411 and net earnings of $10,532,042 for the 1949-50 fiscal year, reports president Henry J. Kaiser.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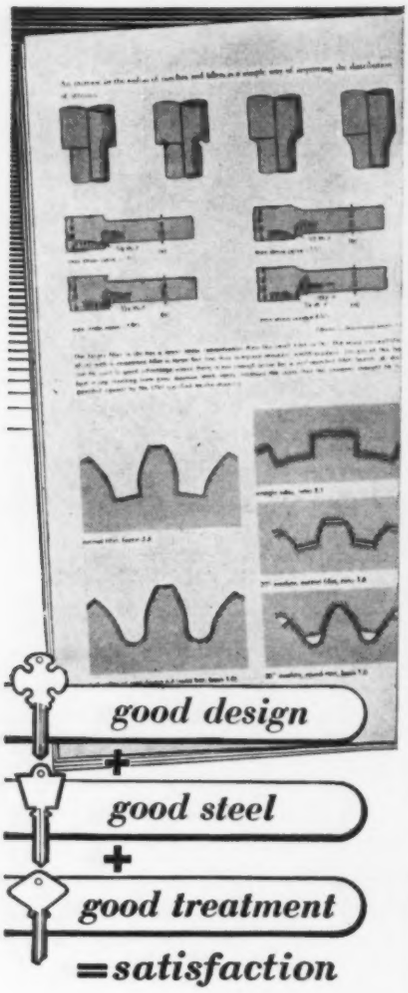

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## • News of Industry •

# STEEL CONSTRUCTION NEWS

**Reinforcing bar awards this week included the following:**

1000 **Tons,** Philadelphia, Delaware power station, Philadelphia Electric Co., to Bethlehem Steel Co., Bethlehem.

800 **Tons,** Framingham, Mass., new Middlesex Shopping Center of 45 stores on Boston-Worcester Turnpike, through G.B.H. Macomber Co., Boston, to Concrete Steel Co., Boston, Mass.

650 **Tons,** Gloucester-Burlington-Camden Counties, N. J., New Jersey Turnpike Authority, contract 53(2), through F. A. Canuso & Son, Philadelphia, to Bethlehem Steel Co., Bethlehem.

365 **Tons,** Chicago, Moody Bible Institute Houghton Hall, to Truscon Steel Co.

205 **Tons,** Northfield, Ill., High School, to Olney J. Dean Steel Co., Chicago.

161 **Tons,** Derby Conn., multiple span rolled beam viaduct, grading and drainage, Mariani Construction Co., New Haven, Conn., low bidder.

160 **Tons,** Jacksonville, Ill., Passavant Hospital, to Laclede Steel Co., St. Louis.

150 **Tons,** Ardmore, Pa., Philadelphia Electric Co., through Robert G. Hoffer, Philadelphia, to Bethlehem Steel Co., Bethlehem.

100 **Tons,** Chester, Pa., Scott Paper Co., through United Engineers & Constructors, Inc., Philadelphia, to Bethlehem Steel Co., Bethlehem.

**Fabricated steel awards this week included the following:**

1000 **Tons,** Framingham, Mass., new Middlesex Shopping Center of 45 stores to cost $5,500,000, on Boston to Worcester Turnpike (New York road), through G. B. H. Macomber Co., Boston, to A. O. Wilson Structural Steel Co., Cambridge, Mass.

950 **Tons,** Philadelphia, warehouse and office building, Penn Fruit Co., to Bethlehem Steel Co., Bethlehem.

622 **Tons,** Derby, Conn., multiple span rolled beam viaduct, grading and drainage. Mariani Construction Co., New Haven, Conn., low bidder.

600 **Tons,** Dorrun, Kentucky, chemical hydration plant for Matheson Chemical Co., through Stone and Webster Engineering Corp., Inc., to Bethlehem Steel Co., Bethlehem, Penn.

225 **Tons,** Bristol, Pa., Rohm & Haas, building No. 68, to Bethlehem Steel Co., Bethlehem.

200 **Tons,** Queens, New York, apartment house, to Grand Iron Works.

**Fabricated steel inquiries this week included the following:**

1025 **Tons,** Hudson County, N. J., New Jersey Turnpike Authority, overpass, Contract 49, due Sept. 7.

760 **Tons,** Philadelphia, extension of Market St. subway from 42 to 46 Sts., due Aug. 30.

200 **Tons,** Pennsburg, Pa., highschool, due Aug. 31.

120 **Tons,** Montgomery County, Md., Maryland State Roads Commission, due Aug. 22.

**Reinforcing bar inquiries this week included the following:**

3000 **Tons,** Tiber, Mont., Tiber dam and dike.

700 **Tons,** Chicago, building for Sears, Roebuck, North and Damen Aves.

490 **Tons,** Trenton, Nebr., Trenton Dam.

450 **Tons,** Dayton, Frigidaire Div., GMC.

370 **Tons,** Oshkosh, Wis., Winnebago County Asylum.

350 **Tons,** Chicago, Chicago Housing Authority, Relocation No. 7.

300 **Tons,** Chicago, Illinois Paint Co.


At Fred Heinzelman & Sons
NEW YORK, N.Y.

Pangborn Hydro-Finish CUTS HAND POLISHING OF DIES 60%

reports Mr. J. L. Crosby, General Manager

***Shown here** is the Pangborn Hydro-Finish unit which set new records at Fred Heinzelman & Sons. A pioneer of heat treated dies, the company reports: Hydro-Finish removes heat treat oxide discoloration, cuts hand polishing 60% to 70%, holds tolerances to a precision .0001"!*

## Find out how HYDRO-FINISH *can save you money*

Hydro-Finish is the answer to modern cleaning, decorating and finishing problems. As Fred Heinzelman & Sons have found, Hydro-Finish virtually eliminates tedious and expensive hand buffing and polishing on tool and die maintenance. Now, dies with heavy oxide discolorations can be cleaned faster and at lower cost.

And, on the production line, Hydro-Finish assures better bonding, electroplating, painting—gives you *the surface you want* within .0001" with no pits, grooves or hard-to-clean imperfections left after cleaning.

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## PUBLICATIONS

*Continued from Page 34*

nickel-zinc sheet, strip, rod, bar and wire; (3) beryllium copper plate, sheet, strip, rod and wire; and (4) copper-nickel sheet and strip. In addition to correlating the five specification systems, the sheet gives general characteristics and typical uses of the phosphor bronze, nickel silver, beryllium copper and cupro nickel alloys. *Riverside Metal Co.*

**For free copy insert No. 8 on postcard, p. 35.**

### Phosphate Coatings

Detailed information about the complete line of ACP phosphate coating chemicals is contained in a new 12-p. bulletin. The booklet discusses chemicals and processes for paint-bonding, rustproofing, protecting friction surfaces, and improving drawing and extrusion. ACP chemicals and the government specifications they meet are also listed. *American Chemical Paint Co.*

**For free copy insert No. 9 on postcard, p. 35.**

### Plastic Pipe

Lightweight, flexible and corrosion-proof Carlon plastic pipe features are described in a new 4-p. folder. Sizes, weights, bursting pressures and other pertinent data are presented to illustrate how this general-purpose plastic pipe provides long-range economy in the field of fluid, gas and vapor transmission. *Carter Products, Inc.*

**For free copy insert No. 10 on postcard, p. 35.**

### Air Control Valves

Complete specifications on the full line of Airmatic valves for hand, foot, mechanical or electrical control of single and double-acting air cylinders are contained in a new catalog. The catalog is made up of individual data sheets for each product and a complete price guide. It describes the construction, operation and valve services, and contains detailed drawings, dimensional tables and other information. *Airmatic Valve, Inc.*

**For free copy insert No. 11 on postcard, p. 35.**

***Resume Your Reading on Page 35***


**ACP**
**PHOSPHATE FINISHES TO MAKE YOUR PRODUCT DURABLE**

## PAINT BONDING

***"Granodine"*** forms a zinc-iron phosphate-coating bond on sheet metal products — automobile bodies and fenders, refrigerator cabinets, etc. — for a durable, lustrous finish.

***"Lithoform"*** makes paint stick to galvanized iron and other zinc and cadmium surfaces.

***"Alodine"***, the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal.

## RUST PROOFING

***"Permadine"***, a zinc phosphate coating chemical, forms on steel an oil-adsorptive coating which bonds rust-inhibiting oils such as "Granoleum."

***"Thermoil-Granodine"***, a manganese-iron phosphate coating chemical, forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

## PROTECTION FOR FRICTION SURFACES

The oiled ***"Thermoil-Granodine"*** coating on pistons, piston rings, cranks, camshafts and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, galling, welding and tearing.

## IMPROVED DRAWING AND EXTRUSION

***"Granodraw"*** forms on pickled surfaces a tightly-bound adherent, zinc-iron phosphate coating which facilitates the cold mechanical deformation of steel, improves drawing, and lengthens die life.

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American Chemical Paint Co.
AMBLER ACP PENNA

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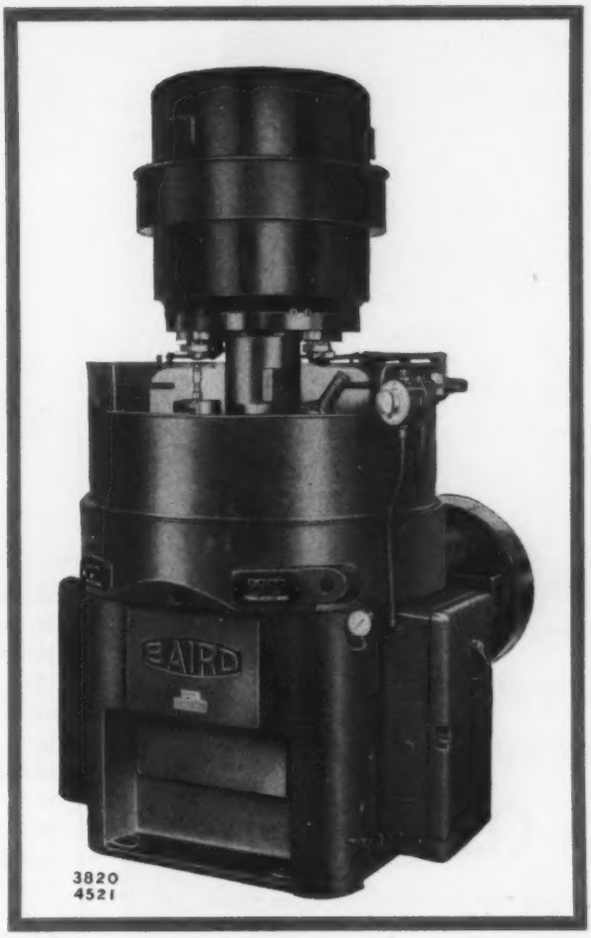
**A Four Spindle Vertical Continuous Lathe having 5" chucks for light turning operations.**

Quite a Versatile Machine




About 43" wide 60" deep 76" high

A continuously revolving turret. Work is automatically gripped, turned and automatically released as the turret passes through its complete cycle.

The work spindle may be automatically positioned to facilitate the loading and unloading of the work as required on some jobs.

As the tooling for each position is complete in itself, machine may be arranged to operate on two similar pieces by having alternate work positions arranged for the one part and the other two alternate work positions arranged for the other part, an advantage when the two parts go together in an assembly.

Cycle time varies with the job

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No more exacting conditions can be imagined than those under which this 1300-ton double action Clearing press has to perform day after day. It is owned by the Superior Tool and Die Company of Detroit, and it is used for test runs of new dies before they are accepted by customers. Every stamping is therefore examined far more critically than would be the case in commerical production. The slightest lack of precision in the press would make it impossible to check the dies properly.

Superior Tool and Die Company chose a Clearing press for this work because they could not afford to compromise with quality. Their customers expect dies to perform without excuses, and the evidence of acceptable stampings is the only evidence that counts. The Clearing press produces that evidence from Superior's carefully made dies.

If you want press equipment that saves time, speeds production, and assures quality output, you can profit from the example of men who "know their stuff" in metalworking.

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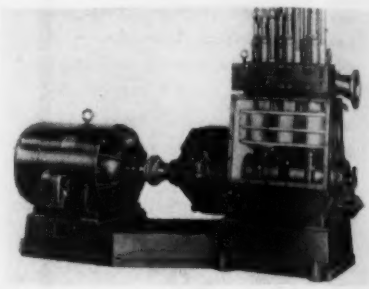
# NEW PRODUCTION IDEAS

*Continued from Page 38*

in construction. A reduced volume of space between valves makes possible a higher volumetric efficiency. A sectionalized fluid end is com-



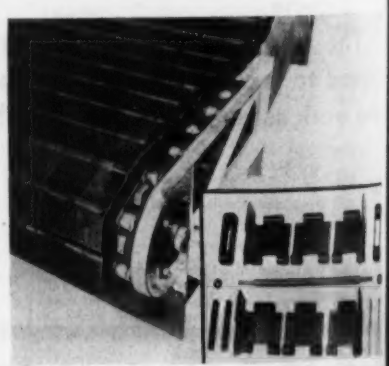
posed of separate units that include the working barrel, stuffing boxes, valve units, plunger, and suction and discharge manifolds. Besides simplicity and accessibility, the sectionalized design of the direct flow pump provides economy of maintenance. Since almost all wearing parts are interchangeable, only three sets are necessary to cover a total range of pump sizes from 100 to 2450 hp. *Aldrich Pump Co.*

**For more data insert No. 26 on postcard, p. 35.**

## Hinged-Steel Belting

**Facilitates mechanized handling of hot or highly abrasive metal parts.**

A new hinged-steel conveyer belting can be assembled into almost any length or width from



stocked component parts. Its precision-formed links are made from heavy gage steel plate, and are fastened by means of high-carbon steel rods so that the side chains

NO-OX-ID "493" removes fingerprints from machined parts and protects against corrosion.

NO-OX-ID prevents corrosion on metal parts while they are in storage.

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Even an invisible fingerprint can cause corrosion . . . can cause rejects on machined parts with close tolerances. NO-OX-ID "493" removes fingerprints, gives the product a corrosion-protective shop coat to permit safe handling of the part during all phases of manufacturing and inspection. This is just one of the many types of NO-OX-IDs. There are others to stop costly corrosion on metal parts and products in storage . . . in shipment and on your dealers' shelves.

Inside your plant . . . in out-buildings . . . storage tanks . . . on cranes and other equipment, rust is constantly, silently at work increasing your operating costs . . . eating into your profits. Here, again, the correct NO-OX-ID will give you maximum protection.

Dearborn Chemical Company has had experience serving industry since 1887. This broad experience is available to you . . . contact Dearborn for assistance on the selection of the correct NO-OX-ID for your needs.

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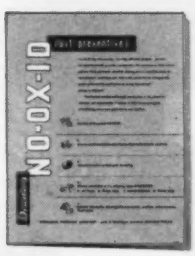


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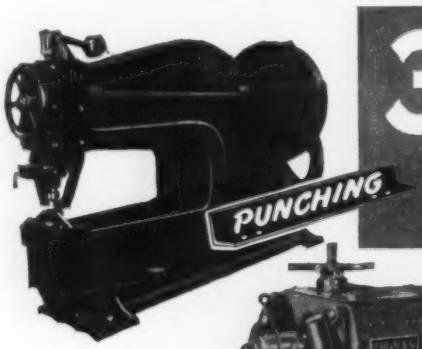
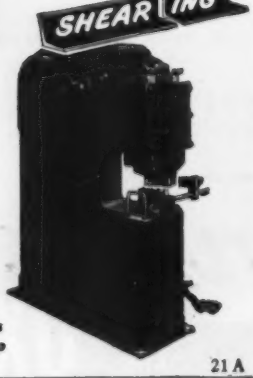



3 important operations
*and a* THOMAS *machine for every one!*




EACH is a vital operation; only the right equipment makes it pay! That's why Thomas Metal-Working Machines have proved so popular in the shops of industrials, railroads and metal fabricators. Each type that bears the Thomas name does a job and *does it better!* Strong, sturdily built, convenient, easy to operate, and above all economical in production.

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21 A




*Continued*

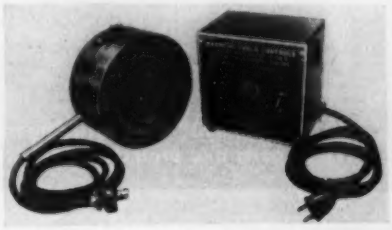
become an integral part of the conveyer belting. Outside links incorporate interlocking side wings that remain positively engaged at all times. Links can be perforated to permit passage of coolants, etc. Working loads up to 300 lb per lineal foot can be handled with ample safety factor, it is reported. *May-Fran Engineering, Inc.*

**For more data insert No. 27 on postcard, p. 35.**

## Magnetic Chuck

**Work is held to surface by magnetic force with a total pull of two tons.**

The electric magnetic chuck for use on lathes comes complete with a control box that plugs in on 115 v,



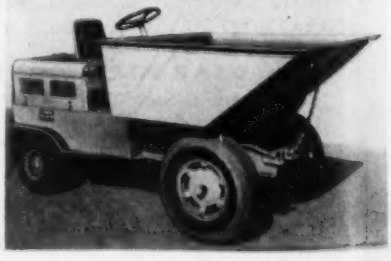
60 cycles. This control box has two switches, one for energizing the surface of the chuck, the other for demagnetizing the chuck surface, effecting the holding or the release of a workpiece. The chuck can be used as a magnetic chuck, demagnetizer, or magnetic inspection tool to inspect small parts for cracks and fractures. *Continental Electric Co.*

**For more data insert No. 28 on postcard, p. 35.**

## Haulage Vehicles

**Tip and dump models have bulk-load capacity of up to 40 cu ft.**

Increased speed, reduced size and greater stability are three new



features of the redesigned Tructractor line of haulage vehicles. A new two-speed transmission permits 14 mph travel in high gear and 8 mph in low gear, in both for-

ward and reverse. A shortened wheelbase, reducing overall length, has made possible a 12-in. decrease in the turning radius. Stability has been increased through the new four-wheel construction and pivoted steering axle. Weight carrying capacity is 4000 lb. *Clark Equipment Co.*

For more data insert No. 29 on postcard, p. 35.

## Preset Speed Device

**Provides a fixed preset speed on General Electric ACA motors.**

The new device enables the predetermined speed to be set manually by a knob either directly on

the ACA motor or at the end of a flexible cable 10 or 15 ft away. Speed adjustment can be made while the motor is at a standstill or while it is running. Speed control of the ACA motor is obtained by rotating brushes around the commutator. *General Electric Co.*

For more data insert No. 30 on postcard, p. 35.

## Electric Relays

**Protects against over, under, and reverse currents in dc circuits.**

Operating voltage in the new type D-3 and DT-3 is supplied by a shunt in series with the protected line. The moving coil is in parallel with the shunt so it will receive current in proportion to the current flowing in the line to be protected. DT-3 relay is to protect transformers and ac or dc motors and generators from damage that will result from abnormally high temperatures. Both relays have single-pole, double-throw contacts. *Westinghouse Electric Corp.*

For more data insert No. 31 on postcard, p. 35.

*Resume Your Reading on Page 39*

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"I'm 100% for the Dustube. For the amount of dust it handles daily the relatively little attention it requires is unbelievable. Periodic inspections are simple — all working parts are easily accessible — in a few minutes the job is finished. Once a week the collector is emptied, with the automatic and efficient shaking of the tubes thoroughly removing all dust without any cloth wear."

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"It would be easy to forget we had a Dustube Dust Collector — we take its benefits and advantages for granted in the cleaning room. However, we can't overlook the complete absence of dust arising from the cleaning machines and the Dustube must get all credit for this. We never have any complaints of dusty conditions from any of our men."

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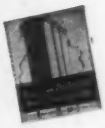
There are no complaints from the crew when you have a Dustube to keep your plant free from dust. The high efficiency of the Dustube makes your plant a happier, healthier place to work . . . it increases productivity. Maintenance men find Dustube requires very little attention. All through the plant everyone agrees: "It pays to own a Dustube."



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## Briefs and Bulletins

**nickel more critical**—The nickel shortage is worsening and alloy producers look for another cutback in nickel allotments from suppliers in September. Military branches are stepping up procurement of this strategic material to build up the national stockpile. A large alloy producer will not accept new orders for steel containing more than 2.5 pct nickel unless it is for critical military application. The producer recently had to turn down an order for 500 tons bearing 9 pct nickel—business for which he would earlier have given his right arm. Crucible Steel Co. has advanced grade extras of nickel-bearing alloy bars $2 to $14 per ton, effective Aug. 1.

**Japan awaits calm**—After Korean war clouds blow over, Japan will try to take advantage of higher world demand and rising prices by pushing through heavy increases in iron and steel production. Output targets next year will be 2,800,000 tons of pig iron and 3,500,000 tons of steel. This year's goals are 1,920,000 tons of pig iron and 2,500,000 tons of steel. To accomplish the increase, Japan must have easy access to sources of raw materials. She wants nothing more than quiet on the mainland.

**carryovers**—Steel buyers in the Detroit area report that deliveries are falling further behind and a substantial carryover is now predicted. This may run as much as 4 to 8 weeks on cold-rolled. Aluminum is also tight and stainless is becoming more critical by the hour. Standard items such as nuts, bolts and screws are also getting tighter, purchasing agents report.

**dearth of pig iron**—The shortage of pig iron is growing more critical in the East due to heavy buying and the increasing scarcity of foreign iron. Foreign iron prices are still going up, with little tonnage being offered. French iron has been offered for early delivery at Mobile at $47.50. Other offerings involve small tonnages, off-grade analyses and delivery next year.

**foreign sheets**—Belgian sheets in light gages are coming in at a delivered price of 7c to 7½c per lb. About 200 tons per month are being imported in the range of 16 to 20 gage.

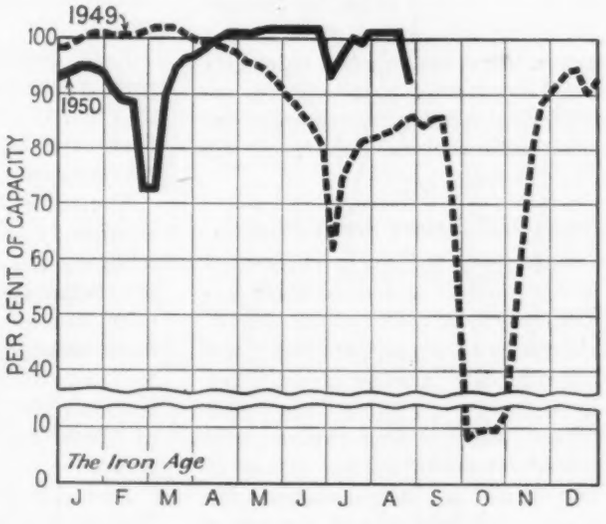
**stainless scrap soars**—Mixed stainless steel scrap is being bought at $112 a ton in Philadelphia, about $50 to $55 a ton more than 6 weeks ago.

**steel plate rise**—Alan Wood Steel Co. raised its steel plate prices by $3.00 a ton last week, making carbon plates $75 and alloy plates $91 a ton. There was no change in floor plates. Plate extras were advanced $2 a ton in lighter than ¼ in. Hot-rolled sheets and strip were also advanced $3.00 a ton, making sheets $72 and strip $70 a ton. Central Iron & Steel Co. raised floor plates by $14.00 a ton to $105 a ton f.o.b. Harrisburg. Worth Steel Co. advanced carbon steel plates $6.00 a ton to $78. There was no change in gage extras.

**conversion**—People who made arrangements several months ago for conversion steel now look like good guessers. One large converter says there is a fairly plentiful supply of conversion ingots but not enough slabs and billets. Railroad car axles for conversion into billets are bringing $75 per ton in Chicago.

**blow out furnace**—Alan Wood expects to blow out its large furnace about Sept. 1. The furnace is ringed up at the top and the deposit will have to be removed. It may be 3 to 4 weeks before it can be blown in again.

### Steel Operations**




### District Operating Rates—Per Cent of Capacity**

| Week of | Pittsburgh | Chicago | Youngstown | Philadelphia | Cleveland | Buffalo | Wheeling | South | Detroit | West | Ohio River | St. Louis | East | Aggregate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug. 13 | 99.0 | 101.0* | 92.5 | 92.0 | 99.5 | 102.0 | 101.0 | 104.0 | 101.0* | 106.8* | 84.5 | 90.0 | 108.0 | 100.5 |
| Aug. 20 | 99.0 | 50.5 | 93.0 | 92.0 | 66.0 | 104.0 | 101.0 | 104.0 | 103.0 | 109.0 | 88.5 | 90.0 | 82.5 | 87.5† |

* Revised.
** Steel operations for the first half of 1950 are based on annual capacity of 99,392,800 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 100,563,500 net tons.
† Tentative.

# Nonferrous Metals OUTLOOK

## Market Activities

**Scrap prices start metal prices upward . . . Producer advances copper 2¢ . . . New 1¢ rise in lead . . . Scrap buying on 24½¢ level . . . Ingot prices rise**

by JOHN ANTHONY

**New York**—Early this week the metal markets were held in the strong grip of inflationary forces. Shortages of copper, lead and zinc, extraordinarily heavy demand for metals, and the keen price competition for scrap were taking their toll.

On Monday, Calumet & Hecla Consolidated Copper Co. advanced its Lake copper price by 2¢ per lb, citing increasing costs as the cause. A custom smelter raised its price for refined copper by 2¢, establishing a split price market for electrolytic copper. This trend will be followed.

### Brass Mill Raises Scrap Price

Last week the brass mills generally started to reduce their operations to a 5-day week due to shortages of copper and zinc, and other metals in some cases. They have not been getting very much scrap either. One brass mill raised its scrap buying prices to the basis of 24½¢ copper. No other mill had raised its scrap prices early this week. So scrap can be expected to flow into its Waterbury plants. Such scrap will be delivered in 2 to 4 weeks, at which time the copper market is expected to be on the 24½¢ level.

American Brass Co. began to price its products on the basis of duty for the account of the buyer. Other mills aren't charging duty yet.

Ingot brass and bronze prices were advanced this week by 2¢ to 2½¢ per lb. This development reflects the lack of scrap flow at former scrap buying prices.

The price of lead was increased another 1¢ per lb early this week, bringing the New York market to 14¢. Sellers report that the higher price has not discouraged buyers from attempting to cover. Some lead smelters have reduced the smelting charge on battery plates to $25.00 a ton to bring in more scrap.

Zinc is holding at the 15¢ price, East St. Louis. The zinc shortage is acute, and there is some possibility that the upward surge of prices may carry zinc to higher levels. The Joplin concentrates price remains unchanged at $99.00 a ton.

Aluminum secondary ingot prices were up an average of 2¢ per lb last week, the third week in succession for increases of that order. Smelters are caught in the upward spiral of scrap prices, and somewhat apathetic about doing business on the present basis. Price quotations may be considered nominal, business being transacted on the basis of what the scrap costs.

### Tin Market Slumps

The tin market took a slump last week due to profit taking by professional traders on the London and Singapore exchanges. The New York price of prompt tin dropped to $1.01 from the peak asking price of $1.095 within a week. But early this week the market bounced back to $1.08.

Virtually all factors have given up hope of copper tariff suspension by Congress at this session. The brass mills are actively studying methods of doing business on a split price copper market. It can be expected that price advances for mill products will be put into effect sometime this week.

### NONFERROUS METALS PRICES

| | Aug. 16 | Aug. 17 | Aug. 18 | Aug. 19 | Aug. 21 | Aug. 22 |
|---|---|---|---|---|---|---|
| Copper, electro, Conn. | 22.50 | 22.50 | 22.50 | 22.50 | 22.50–24.50 | 22.50–24.50 |
| Copper, Lake, delivered | 22.625 | 22.625 | 22.625 | 22.625 | 24.625 | 24.625 |
| Tin, Straits, New York | $1.05 | $1.01 | $1.02 | .... | $1.0775 | $1.09* |
| Zinc, East St. Louis | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Lead, St. Louis | 12.80 | 12.80 | 12.80 | 12.80 | 13.80 | 13.80 |

Note: Quotations are going prices.
*Tentative.



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## MILL PRODUCTS

### Aluminum

*(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)*

**Flat Sheet:** 0.188 in., 2S, 3S, 27.4¢; 4S, 61S-O, 29.3¢; 52S, 31.4¢; 24S-O, 24S-OAL, 30.3¢; 75S-O, 75S-OAL, 36.8¢; 0.081 in., 2S, 3S, 28.4¢; 4S, 61S-O, 30.7¢; 52S, 32.8¢; 24S-O, 24S-OAL, 31.4¢; 75S-O, 75S-OAL, 38.5¢; 0.032 in., 2S, 3S, 30.0¢ 4S, 61S-O, 34.0¢; 52S 36.7¢ 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 48-1¢.

**Plate:** ¼ in., and heavier: 2S, 3S, F, 24.8¢ 4S-F, 27¢; 52S-F, 28.1¢; 61S-O, 27.6¢; 24S-F, 24S-FAL, 28.1¢; 75S-F, 75S-FAL, 34.9¢.

**Extruded Solid Shapes:** Shape factors 1 to 4, 33.6¢ to 67¢; 11 to 13, 34.3¢ to 79¢; 23 to 25, 36.3¢ to $1.08; 35 to 37, 43.3¢ to $1.66.

**Rod Rolled:** 1.5 to 4.5 in., 2S-F, 3S-F, 34.5¢ to 31¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 37¢ to 32.5¢.

**Screw Machine Stock:** Rounds, 11S-T3, R317-T4, ⅛ to 11/32 in., 49.5¢ to 38.5¢; ⅜ to 1½ in., 38¢ to 36¢; 1 9/16 to 3 in., 36¢ to 33¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

**Drawn Wire:** Coiled, 0.051 to 0.374 in.; 2S, 36.5¢ to 27¢; 52S, 44.5¢ to 32.5¢; 56S, 47.5¢ to 39¢; 17S-T4, 50.5¢ to 35¢; 61S-T4, 45¢ to 34.5¢; 75S-T-6, 76.5¢ to 55.5¢.

**Extruded Tubing, Rounds:** 63S-T5; OD in in.: 1¼ to 2, 33.5¢ to 49¢; 2 to 4, 30.5¢ to 41.3¢; 4 to 6, 31¢ to 37.3¢; 6 to 9, 31.5¢ to 39.3¢.

**Roofing Sheet, Flat:** 0.019 in. x 28 in. per sheet, 72 in., $1.008; 96 in., $1.344; 120 in., $1.679, 144 in., $2.017. Gage 0.024 in. x 28 in., 72 in., $1.224; 96 in., $1.633; 120 in., $2.042; 144 in., $2.451. **Coiled Sheet:** 0.019 in. x 28 in., 24.7¢ per lb; 0.024 in. x 28 in., 23.7¢ per lb.

### Magnesium

*(Cents per lb, f.o.b. mill, freight allowed)*

**Sheet and Plate:** M-O, FS-O. ¼ in. 58¢ to 60¢; 3/16 in. 60¢ to 62¢; ⅛ in. 62¢ to 64¢; B & S gage 10, 63¢ to 65¢; 12, 67¢ to 69¢; 14, 73¢ to 78¢; 16, 80¢ to 85¢; 18, 88¢ to 93¢; 20, $1.00 to $1.08; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

**Extruded Round Rod:** M, FS, diam in., ¼ in. to 0.311, 66¢; ⅓ in. to ⅝, 50¢; 1¼ to 1.749, 47¢; 2½ to 5 in., 45¢. Other alloys higher. Base: Up to ⅝ in., diam, 10,000 lb; ⅝ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

**Extruded Solid Shapes, Rectangles:** M, FS, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 59.5¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 55¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 50.5¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 47.5¢ 4 to 6 lb per ft, per. up to 23 in. 46.5¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

**Extruded Round Tubing:** M, FS, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

### Nickel and Monel

*(Base prices, cents per lb, f.o.b. mill)*

| | "A" Nickel | Monel |
|---|---|---|
| Sheets, cold-rolled | 69 | 53 |
| Strip, cold-rolled | 75 | 56 |
| Rods and bars | 65 | 51 |
| Angles, hot-rolled | 65 | 51 |
| Plates | 67 | 52 |
| Seamless tubes | 98 | 86 |
| Shot and blocks | .. | 46 |

### Copper, Brass, Bronze

*(Cents per lb, freight prepaid on 200 lb)*

| | Sheets | Rods | Extruded Shapes |
|---|---|---|---|
| Copper | 37.43 | .... | 37.03 |
| Copper, h-r | .... | 33.28 | .... |
| Copper, drawn | .... | 34.53 | .... |
| Low brass | 35.52 | 35.21 | .... |
| Yellow brass | 34.19 | 33.88 | .... |
| Red brass | 35.96 | 35.65 | .... |
| Naval brass | 38.90 | 32.96 | 34.22 |
| Leaded brass | .... | 28.54 | 32.65 |
| Com'l bronze | 36.93 | 36.62 | .... |
| Manganese bronze | 42.40 | 36.27 | 37.85 |
| Phosphor bronze | 55.11 | 55.36 | .... |
| Muntz metal | 37.13 | 32.69 | 34.94 |
| Everdur, Herculoy, Olympic, etc. | 42.05 | 40.99 | .... |
| Nickel silver 10 pct | 45.48 | 47.74 | .... |
| Arch. bronze | .... | .... | 32.65 |

## PRIMARY METALS

*(Cents per lb, unless otherwise noted)*

| | |
|---|---|
| Aluminum ingot, 99+%, 10,000 lb, freight allowed | 17.50 |
| Aluminum pig | 16.50 |
| Antimony, American, Laredo, Tex. | 24.50 |
| Beryllium metal, 95%, lumps, beads | $95.00 |
| Beryllium copper, 3.75-4.25% Be, dollars per lb contained Be | $30.00 |
| Beryllium aluminum 5% Be, dollars per lb contained Be | $65.00 |
| Bismuth, ton lots | $2.00 |
| Cadmium, del'd | $2.15 |
| Cobalt, 97-99% (per lb) | $1.80 to $1.87 |
| Copper, electro, Conn. Valley | 23.00 |
| Copper, Lake, delivered | 24.625 |
| Gold, U. S. Treas., dollars per oz. | $35.00 |
| Indium, 99.8%, dollars per troy oz. | $3.25 |
| Iridium, dollars per troy oz. | $160 |
| Lead, St. Louis | 13.80 |
| Lead, New York | 14.00 |
| Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb | 22.50 |
| Magnesium, sticks, 100 to 500 lb | 39.00¢ to 41.00¢ |
| Mercury, dollars per 76-lb flask f.o.b. New York | $79 to $80 |
| Nickel, electro, f.o.b. New York | 51.22 |
| Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel | 44.25 |
| Palladium, dollars per troy oz. | $24.00 |
| Platinum, dollars per troy oz. | $74 to $77 |
| Silver, New York, cents per oz. | 72.75 |
| Tin, New York | $1.09 |
| Zinc, East St. Louis | 15.00 |
| Zinc, New York | 15.72 |
| Zirconium copper, 50 pct | $6.20 |

## REMELTED METALS

### Brass Ingot

*(Cents per lb delivered, carloads)*

| | |
|---|---|
| **85-5-5-5 ingot** | |
| No. 115 | 25.50 |
| No. 120 | 25.00 |
| No. 123 | 24.50 |
| **80-10-10 ingot** | |
| No. 305 | 29.50 |
| No. 315 | 27.00 |
| **88-10-2 ingot** | |
| No. 210 | 38.00 |
| No. 215 | 35.00 |
| No. 245 | 29.50 |
| **Yellow ingot** | |
| No. 405 | 21.75 |
| **Manganese bronze** | |
| No. 421 | 27.00 |

### Aluminum Ingot

*(Cents per lb, 30,000 lb lots)*

| | |
|---|---|
| **95-5 aluminum - silicon alloys** | |
| 0.30 copper, max. | 26.00-26.50 |
| 0.60 copper, max. | 25.75-26.25 |
| Piston alloys (No. 122 type) | 25.00-25.50 |
| No. 12 alum. (No. 2 grade) | 24.50-25.00 |
| 108 alloy | 24.50-25.00 |
| 195 alloy | 26.00-26.50 |
| 13 alloy | 26.50-27.00 |
| AXS-679 | 25.00-25.50 |

**Steel deoxidizing aluminum, notch-bar granulated or shot**

| | |
|---|---|
| Grade 1—95-97½% | 26.00-26.50 |
| Grade 2—92-95% | 25.00-25.50 |
| Grade 3—90-92% | 24.00-24.50 |
| Grade 4—85-90% | 23.50-24.00 |

## ELECTROPLATING SUPPLIES

### *Anodes*

*(Cents per lb, freight allowed, in 500 lb lots)*

| | |
|---|---|
| **Copper** | |
| Cast, oval, 15 in. or longer | 39⅛ |
| Electrodeposited | 33¾ |
| Rolled, oval, straight, delivered | 36.59 |
| Forged ball anodes | 41 |
| **Brass, 80-20** | |
| Cast, oval, 15 in. or longer | 34¾ |
| Zinc, oval | 23 |
| Ball anodes | 22 |
| **Nickel 99 pct plus** | |
| Cast | 68.00 |
| Rolled, depolarized | 69.00 |
| Cadmium | $2.30 |
| Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn. | 79½ |

### *Chemicals*

*(Cents per lb, f.o.b. shipping point)*

| | |
|---|---|
| Copper cyanide, 100 lb drum | 52.15 |
| Copper sulfate, 99.5 crystals, bbl. | 10¾ |
| Nickel salts, single or double, 4-100 lb bags, frt allowed | 20½ |
| Nickel chloride, 375 lb drum | 27½ |
| Silver cyanide, 100 oz lots, per oz. | 61¼ |
| Sodium cyanide, 96 pct domestic 200 lb drums | 19.25 |
| Zinc cyanide, 100 lb drums | 45.85 |

## SCRAP METALS

### Brass Mill Scrap

*(Cents per pound; add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 19½ | 18¾ |
| Yellow brass | 16¾ | 16 |
| Red brass | 18½ | 17⅜ |
| Commercial bronze | 18⅜ | 17⅝ |
| Manganese bronze | 16½ | 15⅝ |
| Leaded brass rod ends | 16½ | .... |

### Custom Smelters' Scrap

*(Cents per pound, carload lots, delivered to refinery)*

| | |
|---|---|
| No. 1 copper wire | 21.75 |
| No. 2 copper wire | 20.75 |
| Light copper | 19.75 |
| Refinery brass | 20.00* |
| Radiators | 15.00 |

*Dry copper content.

### Ingot Makers' Scrap

*(Cents per pound, carload lots, delivered to producer)*

| | |
|---|---|
| No. 1 copper wire | 21.75 |
| No. 2 copper wire | 20.75 |
| Light copper | 19.75 |
| No. 1 composition | 19.00-19.25 |
| No. 1 comp turnings | 18.50-18.75 |
| Rolled brass | 16.50-16.75 |
| Brass pipe | 17.75-18.00 |
| Radiators | 15.00 |
| Heavy yellow brass | 15.00 |
| *Aluminum* | |
| Mixed old cast | 15.00 |
| Mixed old clips | 15.50 |
| Mixed turnings, dry | 14.00 |
| Pots and pans | 15.00 |
| Low copper | 16.25 |

### Dealers' Scrap

*(Dealers' buying prices, f.o.b. New York in cents per pound)*

| | |
|---|---|
| **Copper and Brass** | |
| No. 1 heavy copper and wire | 19½—20 |
| No. 2 heavy copper and wire | 18½—19 |
| Light copper | 17½—18 |
| Auto radiators (unsweated) | 13¼—13½ |
| No. 1 composition | 16 —16½ |
| No. 1 composition turnings | 15½—16 |
| Clean red car boxes | 14¾—15 |
| Cocks and faucets | 14¾—15 |
| Mixed heavy yellow brass | 11½—11¾ |
| Old rolled brass | 12¾—13 |
| Brass pipe | 14¾—15 |
| New soft brass clippings | 15¾—16 |
| Brass rod ends | 13¾—14 |
| No. 1 brass rod turnings | 13½—13¾ |
| **Aluminum** | |
| Alum. pistons and struts | 8 — 8½ |
| Aluminum crankcases | 10½—11 |
| 2S aluminum clippings | 13 —13½ |
| Old sheet and utensils | 10½—11 |
| Borings and turnings | 7 |
| Misc. cast aluminum | 10½—11 |
| Dural clips (24S) | 10½—11 |
| **Zinc** | |
| New zinc clippings | 10½—11 |
| Old zinc | 8¼— 8½ |
| Zinc routings | 5¾— 6 |
| Old die cast scrap | 5¾— 6 |
| **Nickel and Monel** | |
| Pure nickel clippings | 38 —41 |
| Clean nickel turnings | 35 —38 |
| Nickel anodes | 38 —41 |
| Nickel rod ends | 38 —41 |
| New Monel Clippings | 17 —21 |
| Clean Monel turnings | 15 —17 |
| Old sheet Monel | 16 —20 |
| Inconel clippings | 22 —26 |
| Nickel silver clippings, mixed | 9 —10 |
| Nickel silver turnings, mixed | 6 — 7 |
| **Lead** | |
| Soft scrap, lead | 11¾—12¼ |
| Battery plates (dry) | 6¾— 7 |
| **Magnesium** | |
| Segregated solids | 9 —10 |
| Castings | 5½— 6½ |
| **Miscellaneous** | |
| Block tin | 73 —75 |
| No. 1 pewter | 53 —55 |
| No. 1 auto babbitt | 46 —48 |
| Mixed common babbitt | 11¾—12½ |
| Solder joints | 15½—16 |
| Siphon tops | 46 —48 |
| Small foundry type | 14½—15 |
| Monotype | 13½—14 |
| Lino. and stereotype | 12½—13 |
| Electrotype | 11¾—12½ |
| New type shell cuttings | 15 —15¼ |
| Hand picked type shells | 6 — 6½ |
| Lino. and stereo. dross | 4¼— 4¾ |
| Electro. dross | 2¾— 3 |

# Comparison of Prices

**Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.**

| Flat-Rolled Steel: (cents per pound) | Aug. 22, 1950 | Aug. 15, 1950 | July 25, 1950 | Aug. 23, 1949 |
|---|---|---|---|---|
| Hot-rolled sheets | 3.35 | 3.35 | 3.35 | 3.25 |
| Cold-rolled sheets | 4.10 | 4.10 | 4.10 | 4.00 |
| Galvanized sheets (10 ga) | 4.40 | 4.40 | 4.40 | 4.40 |
| Hot-rolled strip | 3.25 | 3.25 | 3.25 | 3.25 |
| Cold-rolled strip | 4.21 | 4.21 | 4.21 | 4.038 |
| Plate | 3.50 | 3.50 | 3.50 | 3.40 |
| Plates wrought iron | 7.85 | 7.85 | 7.85 | 7.85 |
| Stains C-R strip (No. 302) | 34.50 | 34.50 | 34.50 | 33.00 |
| **Tin and Terneplate:** (dollars per base box) | | | | |
| Tinplate (1.50 lb) cokes. | $7.50 | $7.50 | $7.50 | $7.75 |
| Tinplate, electro (0.50 lb) | 6.60 | 6.60 | 6.60 | 6.70 |
| Special coated mfg. ternes | 6.35 | 6.35 | 6.35 | 6.65 |
| **Bars and Shapes:** (cents per pound) | | | | |
| Merchant bars | 3.45 | 3.45 | 3.45 | 3.35 |
| Cold-finished bars | 4.145 | 4.145 | 4.145 | 3.995 |
| Alloy bars | 3.95 | 3.95 | 3.95 | 3.75 |
| Structural shapes | 3.40 | 3.40 | 3.40 | 3.25 |
| Stainless bars (No. 302) | 30.00 | 30.00 | 30.00 | 28.50 |
| Wrought iron bars | 9.50 | 9.50 | 9.50 | 9.50 |
| **Wire:** (cents per pound) | | | | |
| Bright wire | 4.50 | 4.50 | 4.50 | 4.15 |
| **Rails:** (dollars per 100 lb) | | | | |
| Heavy rails | $3.40 | $3.40 | $3.40 | $3.20 |
| Light rails | 3.75 | 3.75 | 3.75 | 3.55 |
| **Semifinished Steel:** (dollars per net ton) | | | | |
| Rerolling billets | $54.00 | $54.00 | $54.00 | $52.00 |
| Slabs, rerolling | 54.00 | 54.00 | 54.00 | 52.00 |
| Forging billets | 63.00 | 63.00 | 63.00 | 61.00 |
| Alloy blooms, billets, slabs | 66.00 | 66.00 | 66.00 | 63.00 |
| **Wire Rod and Skelp:** (cents per pound) | | | | |
| Wire rods | 3.85 | 3.85 | 3.85 | 3.40 |
| Skelp | 3.15 | 3.15 | 3.15 | 3.25 |

**Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.**

| Pig Iron: (per gross ton) | Aug. 22, 1950 | Aug. 15, 1950 | July 25, 1950 | Aug. 23, 1949 |
|---|---|---|---|---|
| No. 2, foundry, del'd Phila. | $51.76 | $51.76 | $50.42 | $50.56 |
| No. 2, Valley furnace | 46.50 | 46.50 | 46.50 | 46.50 |
| No. 2, Southern Cin'ti | 49.08 | 49.08 | 49.08 | 45.47 |
| No. 2, Birmingham | 42.38 | 42.38 | 42.38 | 39.38 |
| No. 2, foundry, Chicago† | 46.50 | 46.50 | 46.50 | 46.50 |
| Basic del'd Philadelphia | 50.92 | 50.92 | 49.92 | 49.74 |
| Basic, Valley furnace | 46.00 | 46.00 | 46.00 | 46.00 |
| Malleable, Chicago† | 46.50 | 46.50 | 46.50 | 46.50 |
| Malleable, Valley | 46.50 | 46.50 | 46.50 | 46.50 |
| Charcoal, Chicago | 68.56 | 68.56 | 68.56 | 73.78 |
| Ferromanganese‡ | 173.40 | 173.40 | 173.40 | 173.40 |

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

| Scrap: (per gross ton) | | | | |
|---|---|---|---|---|
| Heavy melt'g steel, P'gh. | $45.75 | $44.75 | $40.75 | $23.25 |
| Heavy melt'g steel, Phila. | 38.50 | 37.50 | 32.50 | 20.00 |
| Heavy melt'g steel, Ch'go | 40.50 | 38.50 | 37.25 | 22.50 |
| No. 1 hy. com. sh't, Det. | 40.50 | 38.50 | 36.00 | 19.50 |
| Low phos. Young'n | 46.75 | 46.75 | 42.75 | 24.75 |
| No. 1 cast, Pittsburgh | 48.75 | 47.75 | 43.75 | 34.50 |
| No. 1 cast, Philadelphia | 42.50 | 41.50 | 38.50 | 30.50 |
| No. 1 cast, Chicago | 50.50 | 49.50 | 45.50 | 40.50 |
| **Coke: Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $14.25 | $14.25 | $14.25 | $14.25 |
| Foundry coke, prompt | 16.25 | 16.25 | 16.25 | 15.75 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electro, Conn. | 23.00 | 22.50 | 22.50 | 17.625 |
| Copper, Lake, Conn. | 24.625 | 22.625 | 22.625 | 17.75 |
| Tin, Straits, New York | $1.09† | $1.075* | 96.00 | $1.03 |
| Zinc, East St. Louis | 15.00 | 15.00 | 15.00 | 10.00 |
| Lead, St. Louis | 13.80 | 12.80* | 11.80 | 14.925 |
| Aluminum, virgin | 17.50 | 17.50 | 17.50 | 17.00 |
| Nickel, electrolytic | 51.22 | 51.22 | 51.22 | 42.93 |
| Magnesium, ingot | 22.50 | 22.50 | 22.50 | 20.50 |
| Antimony, Laredo, Tex. | 24.50 | 24.50 | 24.50 | 38.50 |

†Tentative. *Revised.

# Composite Prices

**Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)**

| | Finished Steel Base Price | Pig Iron | Scrap Steel |
|---|---|---|---|
| Aug. 22, 1950 | 3.837¢ per lb. | 46.61 per gross ton | $41.58 per gross ton |
| One week ago | 3.837¢ per lb. | 46.61 per gross ton | 40.25 per gross ton |
| One month ago | 3.837¢ per lb. | 46.38 per gross ton | 36.83 per gross ton |
| One year ago | 3.705¢ per lb. | 45.91 per gross ton | 21.92 per gross ton |

| | High | Low |
|---|---|---|
| 1950 | 3.837¢ Jan. 3 | 3.837¢ Jan. 3 |
| 1949 | 3.837¢ Dec. 27 | 3.3705¢ May 3 |
| 1948 | 3.721¢ July 27 | 3.193¢ Jan. 1 |
| 1947 | 3.193¢ July 29 | 2.848¢ Jan. 1 |
| 1946 | 2.848¢ Dec. 31 | 2.464¢ Jan. 1 |
| 1945 | 2.464¢ May 29 | 2.396¢ Jan. 1 |
| 1944 | 2.396¢ | 2.396¢ |
| 1943 | 2.396¢ | 2.396¢ |
| 1942 | 2.396¢ | 2.396¢ |
| 1941 | 2.396¢ | 2.396¢ |
| 1940 | 2.30467¢ Jan. 2 | 2.24107¢ Apr. 16 |
| 1939 | 2.35367¢ Jan. 3 | 2.26689¢ May 16 |
| 1938 | 2.58414¢ Jan. 4 | 2.27207¢ Oct. 18 |
| 1937 | 2.58414¢ Mar. 9 | 2.32263¢ Jan. 4 |
| 1936 | 2.32263¢ Dec. 28 | 2.05200¢ Mar. 10 |
| 1935 | 2.07542¢ Oct. 1 | 2.06492¢ Jan. 8 |
| 1932 | 1.89196¢ July 5 | 1.83910¢ Mar. 1 |
| 1929 | 2.31773¢ May 28 | 2.26498¢ Oct. 29 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

| | High | Low |
|---|---|---|
| 1950 | $46.61 Aug. 8 | $45.88 Jan. 3 |
| 1949 | 46.87 Jan. 18 | 45.88 Sept. 6 |
| 1948 | 46.91 Oct. 12 | 39.58 Jan. 6 |
| 1947 | 37.98 Dec. 30 | 30.14 Jan. 7 |
| 1946 | 30.14 Dec. 10 | 25.37 Jan. 1 |
| 1945 | 25.37 Oct. 23 | 23.61 Jan. 2 |
| 1944 | $23.61 | $23.61 |
| 1943 | 23.61 | 23.61 |
| 1942 | 23.61 | 23.61 |
| 1941 | $23.61 Mar. 20 | $23.45 Jan. 2 |
| 1940 | 23.45 Dec. 23 | 22.61 Jan. 2 |
| 1939 | 22.61 Sept. 19 | 20.61 Sept. 12 |
| 1938 | 23.25 June 21 | 19.61 July 6 |
| 1937 | 32.25 Mar. 9 | 20.25 Feb. 16 |
| 1936 | 19.74 Nov. 24 | 18.73 Aug. 11 |
| 1935 | 18.84 Nov. 5 | 17.83 May 14 |
| 1932 | 14.81 Jan. 5 | 13.56 Dec. 6 |
| 1929 | 18.71 May 14 | 18.21 Dec. 17 |

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

| | High | Low |
|---|---|---|
| 1950 | $41.58 Aug. 22 | $26.25 Jan. 3 |
| 1949 | 43.00 Jan. 4 | 19.33 June 28 |
| 1948 | 43.16 July 27 | 39.75 Mar. 9 |
| 1947 | 42.58 Oct. 28 | 29.50 May 20 |
| 1946 | 31.17 Dec. 24 | 19.17 Jan. 1 |
| 1945 | 19.17 Jan. 2 | 18.92 May 22 |
| 1944 | 19.17 Jan. 11 | 15.76 Oct. 24 |
| 1943 | $19.17 | $19.17 |
| 1942 | 19.17 | 19.17 |
| 1941 | $22.00 Jan. 7 | $19.17 Apr. 10 |
| 1940 | 21.83 Dec. 30 | 16.04 Apr. 9 |
| 1939 | 22.50 Oct. 3 | 14.08 May 16 |
| 1938 | 15.00 Nov. 22 | 11.00 June 7 |
| 1937 | 21.92 Mar. 30 | 12.67 June 9 |
| 1936 | 17.75 Dec. 21 | 12.67 June 8 |
| 1935 | 13.42 Dec. 10 | 10.33 Apr. 29 |
| 1932 | 8.50 Jan. 12 | 6.43 July 5 |
| 1929 | 17.58 Jan. 29 | 14.08 Dec. 8 |

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

UNIVERSITY OF MICHIGAN LIBRARIES

MARKETS—PRICES—TRENDS

# SCRAP
## *Iron & Steel*

# Scrap Prices Beat Pre-Korean War Highs

A sale in Pittsburgh of No. 1 heavy melting steel at $46.00 a ton brought that price to within a dollar of the all-time high for that market which was reached early in June. Meanwhile the majority of the other marts saw a price on the top steel grade that was higher than this year's record.

Most markets continued at a fairly high rate of activity and many members of the trade predicted even higher prices in the near future. Some felt that these increases would certainly bring price controls, while others pointed out that price fixing would have to be clamped on the whole economy and not merely on scrap.

The cast market is generally picking up along with other grades and increases of $2.00 and more were registered in some grades of cast.

With average prices of No. 1 steel at $45.75 in Pittsburgh, $38.50 in Philadelphia, and $40.50 in Chicago, THE IRON AGE steel scrap composite price was pushed up to a new high for the year of $41.58 per gross ton, surpassing the previous top by 66¢ a ton.

**PITTSBURGH**—A district mill bought a representative tonnage of the top melting grade for $46.00, an advance of $1.00 and within a dollar of the all-time high. No. 1 bundles, commanding a premium, were bought for $48.00, up $3.00 from last week. The market continued strong, and indications were that prices will advance still further. Machine shop turnings and short turnings rose $1.00, low phos plate jumped $3.00 to $51.00, top. The latest railroad list went for higher prices, with No. 1 RR bringing $50.00, up $3.50, and specialties going for $53.00. Only part of this scrap, notably specialties, came into this district. Cast grades were stronger.

**CHICAGO**—In the absence of any new mill buying No. 1 heavy melting steel is quotable on appraisal at $41.00 per gross ton and No. 2 heavy melting steel at $39.00 per gross ton. Scrap is moving from dealers to brokers at $39.50 per gross ton for No. 1 heavy melting steel. Turnings are up $1.00 and $2.00 on the basis of recently reported sales. Railroad items continue to move up rapidly. Brokers are in a short position and are having difficulty covering old orders.

**PHILADELPHIA** — Pressure from the West is a factor in the local market activity. There was no new buying last week and some orders are running out. Heavy melting prices are quoted $1.00 higher, except No. 2 bundles. Machine shop and blast furnace turnings have been sold for delivery to Pittsburgh at an increase of $1.00. Low phos is also $1.00 higher. Cast grades are up by $1.00 to $2.00. Heavy breakable is up $1.50; carwheels are up $2.00. Scrap is still coming into yards slowly.

**NEW YORK**—The mills have not come into this market heavily and most business is by brokers covering old orders. Prices are somewhat more stable than last week but there were some revisions, particularly in the cast grades. No. 1 machinery cast was up 50¢ and mixed yard cast and charging box cast were both $1.00 higher.

**DETROIT**—The Detroit market is very active again and prices here are up from $1.00 to $3.00 this week on the strength of quiet but persistent mill buying. While some dealers are reported to be holding out for a higher price, tonnage movements have been high. Late this week large industrial lists will be up for sale. The feeling here is that in the present strong market the prices for industrial scrap may again reach the previous high as a result of strong competitive bidding by the trade.

**CLEVELAND**—Prices were unchanged here and in the Valley at press time as the market reached a temporary impasse. Brokers are probing the market at $48.00, a price paid for a tonnage of railroad steel in the Valley last week, but mills are unresponsive. The market is close to the last peak, and like the last time, there is a terrific short interest. Next sale will probably not be for less than $48.00 for dealer grades, or about $2.00 under the last price paid a major railroad for its heavy melting. Dealers are selling, and tonnage is moving on old $42.00 orders, as well as on the $46.00 orders put out more than a week ago.

**ST. LOUIS** — The market continues strong in the St. Louis industrial district. One of the mills is out of the market, while another is buying in small lots, and outside St. Louis. Offerings are light. Railroad lists are small and bring top prices. Railroad specialties are in particularly strong demand and the supply is limited.

**CINCINNATI** — Sale of a substantial tonnage of No. 1 heavy melting steel at $43.00 spearheaded another general advance in scrap prices here. The market is very strong at quoted prices. Most major consumers in this district are buying, primarily to prevent tonnage from moving to other districts, but foundries are also active in the premium grades. Dealers are selling, probably figuring that this market is nearing another top.

**BOSTON**—The scrap market is in quite a stir of activity, but it appears to be more stable than it was last week when sizable price advances were accompanied by a lot of uncertainty. The signs of stabilization point definitely at the higher levels. The only price changes this week were increases in cast grades.

**BIRMINGHAM**—Despite increases of up to $2.00 per ton for openhearth scrap by brokers in this area, a large tonnage is moving out of the southeastern states to the North and East. If continued, this may cause a shortage in this district. Trade deals by northern users of finished goods are also reported increasing and some buyers in finished products are reported to be buying scrap above the market and selling it to suppliers below the market in order to get the finished products.

**BUFFALO** — Prices jumped an additional $2.00 in the cast market as sales of cupola were reported within a range of $38.50 to $39.00. Strength continued to grip the market but business in steelmaking items was at a standstill as leading mill consumers refused to go along with the rising prices.

UNIVERSITY OF MICHIGAN LIBRARIES

Iron and Steel

# SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Pittsburgh

| | |
|---|---|
| No. 1 hvy. melting | $45.50 to $46.00 |
| No. 2 hvy. melting | 37.00 to 37.50 |
| No. 1 bundles | 47.50 to 48.00 |
| No. 2 bundles | 36.50 to 37.00 |
| Machine shop turn. | 32.50 to 33.00 |
| Mixed bor. and ms. turns. | 32.50 to 33.00 |
| Shoveling turnings | 36.50 to 37.00 |
| Cast iron borings | 34.50 to 35.00 |
| Low phos. plate | 50.50 to 51.00 |
| Heavy turnings | 42.50 to 43.00 |
| No. 1 RR. hvy. melting | 49.50 to 50.00 |
| Scrap rails, random lgth. | 49.00 to 49.50 |
| Rails 2 ft and under | 50.00 to 51.00 |
| RR. steel wheels | 52.00 to 53.00 |
| RR. spring steel | 52.00 to 53.00 |
| RR. couplers and knuckles | 52.00 to 53.00 |
| No. 1 machinery cast | 48.50 to 49.00 |
| Mixed yard cast. | 44.00 to 44.50 |
| Heavy breakable cast. | 38.50 to 39.00 |
| Malleable | 51.00 to 52.00 |

## Chicago

| | |
|---|---|
| No. 1 hvy. melting | $40.00 to $41.00 |
| No. 2 hvy. melting | 38.00 to 39.00 |
| No. 1 factory bundles | 40.00 to 41.00 |
| No. 1 dealers' bundles | 40.00 to 41.00 |
| No. 2 dealers' bundles | 31.00 to 32.00 |
| Machine shop turn. | 29.00 to 30.00 |
| Mixed bor. and turn. | 30.00 to 31.00 |
| Shoveling turnings | 31.00 to 32.00 |
| Cast iron borings | 31.00 to 32.00 |
| Low phos. forge crops | 49.00 to 50.00 |
| Low phos. plate | 48.00 to 49.00 |
| No. 1 RR. hvy. melting | 44.50 to 45.50 |
| Scrap rails, random lgth. | 53.00 to 54.00 |
| Rerolling rails | 57.00 to 58.00 |
| Rails 2 ft and under | 58.00 to 59.00 |
| Locomotive tires, cut | 54.00 to 55.00 |
| Cut bolsters & side frames | 51.00 to 52.00 |
| Angles and splice bars | 54.00 to 55.00 |
| RR. steel car axles | 74.00 to 75.00 |
| RR. couplers and knuckles | 51.00 to 52.00 |
| No. 1 machinery cast. | 50.00 to 51.00 |
| No. 1 agricul. cast. | 47.00 to 48.00 |
| Heavy breakable cast. | 39.00 to 40.00 |
| RR. grate bars | 38.00 to 39.00 |
| Cast iron brake shoes | 41.00 to 42.00 |
| Cast iron car wheels | 42.00 to 43.00 |
| Malleable | 54.00 to 55.00 |

## Philadelphia

| | |
|---|---|
| No. 1 hvy. melting | $38.00 to $39.00 |
| No. 2 hvy. melting | 35.00 to 36.00 |
| No. 1 bundles | 38.00 to 39.00 |
| No. 2 bundles | 30.00 to 31.00 |
| Machine shop turn. | 27.00 to 28.00 |
| Mixed bor. and turn. | 25.00 to 26.00 |
| Shoveling turnings | 31.00 to 32.00 |
| Los phos. punchings, plate | 43.00 to 44.00 |
| Low phos. 5 ft and under | 43.00 to 44.00 |
| Low phos. bundles | 40.00 to 41.00 |
| Hvy. axle forge turn. | 38.00 to 39.00 |
| Clean cast chem. borings | 34.00 to 35.00 |
| RR. steel wheels | 43.00 to 44.00 |
| RR. spring steel | 43.00 to 44.00 |
| Rails 18 in. and under | 48.00 to 49.00 |
| No. 1 machinery cast. | 42.00 to 43.00 |
| Mixed yard cast | 35.00 to 36.00 |
| Heavy breakable cast | 37.50 to 38.50 |
| Cast iron carwheels | 45.00 to 46.00 |
| Malleable | 49.00 to 50.00 |

## Cleveland

| | |
|---|---|
| No. 1 hvy. melting | $43.00 to $43.50 |
| No. 2 hvy. melting | 35.50 to 36.00 |
| No. 1 busheling | 43.00 to 43.50 |
| No. 1 bundles | 43.00 to 43.50 |
| No. 2 bundles | 28.00 to 28.50 |
| Machine shop turn. | 30.00 to 30.50 |
| Mixed bor. and turn. | 33.00 to 33.50 |
| Shoveling turnings | 33.00 to 33.50 |
| Cast iron borings | 33.00 to 33.50 |
| Low phos. 2 ft and under | 44.00 to 44.50 |
| Steel axle turn. | 43.00 to 43.50 |
| Drop forge flashings | 43.00 to 43.50 |
| No. 1 RR. hvy. melting | 47.00 to 47.50 |
| Rails 3 ft and under | 51.00 to 52.00 |
| Rails 18 in. and under | 54.00 to 55.00 |
| No. 1 machinery cast. | 49.00 to 50.00 |
| RR. cast. | 49.00 to 50.00 |
| RR. grate bars | 37.00 to 38.00 |
| Stove plate | 41.00 to 42.00 |
| Malleable | 49.00 to 50.00 |

## Youngstown

| | |
|---|---|
| No. 1 hvy. melting | $45.50 to $46.00 |
| No. 2 hvy. melting | 37.50 to 38.00 |
| No. 1 bundles | 45.50 to 46.00 |
| No. 2 bundles | $34.50 to $35.00 |
| Machine shop turn. | 34.50 to 35.00 |
| Shoveling turnings | 36.50 to 37.00 |
| Cast iron borings | 36.50 to 37.00 |
| Low phos. plate | 46.50 to 47.00 |

## Buffalo

| | |
|---|---|
| No. 1 hvy. melting | $39.00 to $40.00 |
| No. 2 hvy. melting | 36.00 to 37.00 |
| No. 1 busheling | 36.00 to 37.00 |
| No. 1 bundles | 37.00 to 38.00 |
| No. 2 bundles | 34.00 to 35.00 |
| Machine shop turn. | 30.00 to 31.00 |
| Mixed bor. and turn. | 30.00 to 31.00 |
| Shoveling turnings | 32.00 to 34.00 |
| Cast iron borings | 30.00 to 31.00 |
| Low phos. plate | 41.00 to 42.00 |
| Scrap rails, random lgth. | 44.00 to 45.00 |
| Rails 2 ft and under | 48.00 to 50.00 |
| RR. steel wheels | 47.00 to 48.00 |
| RR. spring steel | 47.00 to 48.00 |
| RR. couplers and knuckles | 47.00 to 48.00 |
| No. 1 machinery cast. | 41.50 to 42.00 |
| No. 1 cupola cast. | 38.50 to 39.00 |
| Small Indus. malleable | 37.00 to 38.00 |

## Birmingham

| | |
|---|---|
| No. 1 hvy. melting | $33.00 to $34.00 |
| No. 2 hvy. melting | 29.00 to 30.00 |
| No. 2 bundles | 27.00 to 28.00 |
| No. 1 busheling | 29.00 to 30.00 |
| Machine shop turn. | 27.00 to 28.00 |
| Shoveling turnings | 29.00 to 30.00 |
| Cast iron borings | 24.00 to 25.00 |
| Bar crops and plate | 41.00 to 42.00 |
| Structural and plate | 41.00 to 42.00 |
| Scrap rails, random lgth. | 43.00 to 44.00 |
| Rerolling rails | 48.00 to 49.00 |
| Rails 2 ft and under | 48.00 to 49.00 |
| Angles & splice bars | 47.00 to 48.00 |
| Std. steel axles | 44.00 to 45.00 |
| No. 1 cupola cast | 43.00 to 44.00 |
| Stove plate | 43.00 to 44.00 |
| Cast iron carwheels | 37.00 to 38.00 |

## St. Louis

| | |
|---|---|
| No. 1 hvy. melting | $38.00 to $39.00 |
| No. 2 hvy. melting | 33.00 to 34.00 |
| No. 2 bundled sheets | 33.00 to 34.00 |
| Machine shop turn. | 26.00 to 27.00 |
| Shoveling turnings | 27.00 to 28.00 |
| Rails, random lengths | 44.00 to 46.00 |
| Rails 3 ft and under | 45.00 to 46.00 |
| Locomotive tires, uncut | 42.00 to 43.00 |
| Angles and splice bars | 45.00 to 46.00 |
| Std. steel car axles | 65.00 to 66.00 |
| RR. spring steel | 44.00 to 45.00 |
| No. 1 machinery cast. | 40.00 to 41.00 |
| Hvy. breakable cast. | 36.00 to 38.00 |
| Cast iron brake shoes | 39.00 to 40.00 |
| Stove plate | 35.00 to 36.00 |
| Cast iron car wheels | 39.00 to 40.00 |
| Malleable | 45.00 to 46.00 |

## New York

Brokers' buying prices per gross ton, on cars:

| | |
|---|---|
| No. 1 hvy. melting | $34.50 to $35.00 |
| No. 2 hvy. melting | 27.50 to 28.00 |
| No. 2 bundles | 26.00 to 27.00 |
| Machine shop turn. | 22.50 to 23.00 |
| Mixed bor. and turn. | 22.50 to 23.00 |
| Shoveling turnings | 25.00 to 25.50 |
| Clean cast chem. bor. | 29.00 to 30.00 |
| No. 1 machinery cast. | 32.50 to 33.00 |
| Mixed yard cast. | 30.50 to 31.00 |
| Charging box cast. | 30.50 to 31.00 |
| Heavy breakable cast. | 30.00 to 30.50 |
| Unstrp. motor blocks | 24.00 to 25.00 |

## Boston

Brokers' buying prices per gross ton, on cars:

| | |
|---|---|
| No. 1 hvy. melting | $33.00 to $34.00 |
| No. 2 hvy. melting | 25.00 to 26.00 |
| No. 1 bundles | 33.00 to 34.00 |
| No. 2 bundles | $25.00 to $26.00 |
| Machine shop turn. | 22.00 to 22.50 |
| Mixed bor. and turn. | 22.00 to 23.00 |
| Shoveling turnings | 25.00 to 25.50 |
| No. 1 busheling | 32.00 to 33.00 |
| Clean cast chem. borings | 25.00 to 26.00 |
| No. 1 machinery cast. | 33.00 to 34.00 |
| Mixed cupola cast. | 31.00 to 32.00 |
| Heavy breakable cast. | 29.00 to 30.00 |
| Stove plate | 29.00 to 30.00 |

## Detroit

Brokers' buying prices per gross ton, on cars:

| | |
|---|---|
| No. 1 hvy. melting | $37.00 to $38.00 |
| No. 2 hvy. melting | 32.00 to 33.00 |
| No. 1 bundles | 40.00 to 41.00 |
| New busheling | 37.00 to 38.00 |
| Flashings | 37.00 to 38.00 |
| Machine shop turn. | 26.00 to 27.00 |
| Mixed bor. and turn. | 26.00 to 27.00 |
| Shoveling turnings | 31.00 to 32.00 |
| Cast iron borings | 31.00 to 32.00 |
| Low phos. plate | 38.00 to 39.00 |
| No. 1 cupola cast. | 40.50 to 41.00 |
| Heavy breakable cast. | 32.50 to 33.00 |
| Stove plate | 34.50 to 35.00 |
| Automotive cast. | 44.00 to 45.00 |

## Cincinnati

Per gross ton, f.o.b. cars:

| | |
|---|---|
| No. 1 hvy. melting | $42.50 to $43.00 |
| No. 2 hvy. melting | 36.50 to 37.00 |
| No. 1 bundles | 42.50 to 43.00 |
| No. 2 bundles, black | 36.50 to 37.00 |
| No. 2 bundles, mixed | 27.50 to 28.00 |
| Machine shop turn. | 24.50 to 25.00 |
| Mixed bor. and turn. | 26.50 to 27.00 |
| Shoveling turnings | 27.50 to 28.00 |
| Cast iron borings | 27.50 to 28.00 |
| Low phos. 18 in. under | 51.00 to 52.00 |
| Rails, random lengths | 46.00 to 47.00 |
| Rails, 18 in. and under | 54.00 to 55.00 |
| No. 1 cupola cast. | 50.00 to 51.00 |
| Hvy. breakable cast. | 41.00 to 42.00 |
| Drop broken cast. | 52.00 to 53.00 |

## San Francisco

F.o.b. shipping point:

| | |
|---|---|
| No. 1 hvy. melting | $23.50 |
| No. 2 hvy. melting | 21.00 |
| No. 1 bundles | 23.50 |
| No. 2 bundles | 19.50 |
| No. 3 bundles | 16.50 |
| Machine shop turn. | 12.00 |
| Elec. fur. 1 ft and under | 34.00 |
| No. 1 RR. hvy. melting | 23.50 |
| Scrap rails, random lgth. | 23.50 |
| No. 1 cupola cast. | $33.50 to 35.00 |

## Los Angeles

F.o.b. shipping point:

| | |
|---|---|
| No. 1 hvy. melting | $23.50 |
| No. 2 hvy. melting | 21.00 |
| No. 1 bundles | 23.50 |
| No. 2 bundles | 19.50 |
| No. 3 bundles | 16.50 |
| Mach. shop turn. | 11.00 |
| Elec. fur. 1 ft and under | 36.00 |
| No. 1 RR. hvy. melting | 23.50 |
| No. 1 cupola cast. | $33.50 to 35.00 |

## Seattle

| | |
|---|---|
| No. 1 hvy. melting | $24.00 |
| No. 2 hvy. melting | 24.00 |
| No. 1 bundles | 22.00 |
| No. 2 bundles | 22.00 |
| No. 3 bundles | 18.00 |
| Elec. fur. 1 ft and under | $29.00 to 30.00 |
| RR. hvy. melting | 25.00 |
| No. 1 cupola cast | 35.00 |
| Heavy breakable cast. | 25.00 |

## Hamilton, Ont.

| | |
|---|---|
| No. 1 hvy. melting | $30.00 |
| No. 1 bundles | 30.00 |
| No. 2 bundles | 29.50 |
| Mechanical bundles | 28.00 |
| Mixed steel scrap | 26.00 |
| Mixed bor. and turn. | 23.00 |
| Rails, remelting | 30.00 |
| Rails, rerolling | 33.00 |
| Bushelings | 24.50 |
| Bush., new fact, prep'd. | 29.00 |
| Bush., new fact, unprep'd. | 23.00 |
| Short steel turnings | 23.00 |
| Cast scrap | 40.00 |

## *no. 1 railroad heavy melting steel**

***use:***

Used by open hearth furnaces in manufacturing new steels.

***source:***

Locomotive boiler casings, car under frames, railroad bridges, etc. All prepared to specification.

**This is one of a series illustrating the various types of scrap used in making iron and steel. Call on our well trained and experienced organization to furnish this as well as any other grade of scrap. We solicit your inquiries.**

**Clean wrought iron or steel scrap ¼ inch and over in thickness, not over 18 inches in width, and not over 5 feet in length. Individual pieces must be free from attachments and cut so as to lie reasonably flat in charging box. May include new mashed pipe ends, original diameter four inches and over. No needle or skeleton plate, agricultural shapes, annealing pots, boiler tubes, grate bars, cast iron, malleable iron, or curly or unwieldy pieces will be accepted*

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**LEADERS IN IRON AND STEEL SCRAP SINCE 1889**

IRON AGE

# STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

| | Pittsburgh | Chicago | Gary | Cleveland | Canton Massillon | Middletown | Youngstown | Bethlehem | Buffalo | Conshohocken | Johnstown | Sparrows Point | Granite City | Detroit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **INGOTS** Carbon forging, net ton | $50.00[1] | | | | | | | | | | | | | $50.00[31] |
| Alloy, net ton | $51.00[1,17] | | | | | | | | | | | | | $51.00[31] |
| **BILLETS, BLOOMS, SLABS** Carbon, rerolling, net ton | $53.00[1] | $53.00[1] | $53.00[1] | | | | $57.00[13] | | $53.00[2] | $62.00[26] | $53.00[3] | | | |
| Carbon forging billets, net ton | $63.00[1] | $63.00[1,4] | $63.00[1,3] | $63.00[4] | | | $63.00[25] | | $63.00[3,4] | $68.00[26] | $63.00[3] | | | $66.00[31] |
| Alloy, net ton | $66.00[1,17] | $66.00[1,4] | $66.00[1] | | $66.00[4,42] | | $66.00[13] | $66.00[3] | $66.00[3,4] | $70.00[26] | $66.00[3] | | | $66.00[31] |
| **PIPE SKELP** | 3.15[1] | | | | | | 3.15[1,4] | | | | | | | |
| **WIRE RODS** | 3.85[2,18] | 3.85[2,4,33] | 3.85[5] | 3.85[3] | | | 3.85[5] | | | | 3.85[3] | 3.95[3] | | |
| **SHEETS** Hot-rolled (18 ga. & hvr.) | 3.35[1,5,9,15] | 3.35[23] | 3.35[1,5,8] | 3.35[4,5] | | | 3.35[1,4,5] 3.50[13] | | 3.35[3] | 3.60[26] | | 3.35[3] | | 3.55[12] 4.15[47] |
| Cold-rolled | 4.10[1,5,7,9,15] 5.10[63] | | 4.10[1,5,8] | 4.10[4,15] | | 4.10[7] | 4.10[4,5] | | 4.10[3] | | | 4.10[3] | 4.30[23] | 4.30[12] |
| Galvanized (10 gage) | 4.40[1,9,15] | | 4.40[1,3] | | 4.40[4] | | 4.65[64] 4.75[44] | | | | | 4.40[3] | | |
| Enameling (12 gage) | 4.40[1] | | 4.40[1,3] | 4.40[4] | | 4.40[7] | 4.40[5] 4.90[76] | | | | | | 4.60[23] | 4.70[12] |
| Long ternes (10 gage) | 4.80[9,15] | | 4.80[1] | | | 4.80[7] | 4.80[64] | | | | | | | |
| Hi Str. low alloy, h.r. | 5.05[1,5,9] | 5.05[1] | 5.05[1,5,8] | 5.05[4,5] | | | 5.05[1,4,5,13] | | 5.05[3] | 5.05[26] | | 5.05[3] | | 5.25[12] |
| Hi str. low alloy, c.r. | 6.20[1,5,9] | | 6.20[1,5,8] | 6.20[4,5] | | | 6.20[4,5,13] | | 6.20[3] | | | 6.20[3] | | 6.40[12] |
| Hi str. low alloy, galv. | 6.75[1] | | | | | | | | | | | 6.75[3] | | |
| **STRIP** Hot-Rolled | 3.25[5,7,9] 3.50[28,41] | 3.25[3,66] | 3.25[1,5,8] | 3.25[5] | | | 3.25[1,4,5] 3.50[13] | | 3.25[3] | 3.50[26] | | 3.25[3] | | 3.45[12] 4.05[47] |
| Cold-rolled | 4.15[5,7,9] 4.50[63] | 4.30[5] 4.50[66] | 4.30[5] | 4.15[3,5] | | 4.15[7] | 4.15[4,5,48,49] 4.50[13,49] | | 4.15[3] | | | 4.15[3] | | 4.35[12] 4.75[55,61] 4.95[47] |
| Hi str. low alloy, h.r. | 4.95[9] | | 4.95[1,5,8] | 4.95[5] | | | 4.95[1,4,5,13] | | 4.95[3] | 4.95[26] | | 4.95[3] | | 5.15[12] |
| Hi Str. low alloy, c.r. | 6.20[9] | | | 6.20[2,5] | | | 6.20[4,5,13] | | 6.40[3] | | | 6.40[3] | | 6.40[12] |
| **TINPLATE†** Coke, 1.50-lb base box 1.25 lb, deduct 20¢ | $7.50[1,5,9,15] | | $7.50[1,5,8] | | | | $7.50[4] | | | | | $7.60[3] | $7.70[22] | |
| Electrolytic 0.25, 0.50, 0.75 lb box | Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price | | | | | | | | | | | | | |
| **BLACKPLATE, 29 gage** Hollowware enameling | 5.30[1,5,15] | | 5.30[1,5] | | | | 5.30[4] | | | | | 5.40[3] | 5.50[23] | |
| **BARS** Carbon steel | 3.45[1,5,9] | 3.45[1,4,23] | 3.45[1,5,8] | 3.45[4] | 3.45[4] | | 3.45[1,4,5] | | 3.45[3,4] | | 3.45[3] | | | 3.65[12] |
| Reinforcing‡ | 3.45[1,5] | 3.45[4] | 3.45[1,5,8] | 3.45[4] | | | 3.45[1,4,5] | | 3.45[3,4] | | 3.45[3] | 3.45[3] | | |
| Cold-finished | 4.10[5] 4.15[2,4,17,52,69,71] | 4.15[2,23,69,70] | 4.15[4,73,74] | 4.15[2,61] | 4.15[4,32,52] | | 4.15[5,40,57] | | 4.15[70] | | | | | 4.35[12] 4.30[64] |
| Alloy, hot-rolled | 3.95[1,17] | 3.95[1,4,23] | 3.95[1,5,8] | | 3.95[4] | | 3.95[1,5,25] | 3.95[3] | 3.95[3,4] | | 3.95[3] | | | 4.25[12] |
| Alloy, cold-drawn | 4.90[2,17,52,69,71] | 4.90[2,23,69,70] | 4.90[4,73,74] | 4.90[2,61] | 4.90[4,43,52] | | 4.90[5,25,57] | 4.90[3] | 4.90[3,70] | | | | | 5.05[64] |
| Hi str. low alloy, h.r. | 5.20[1,5] | | 5.20[1,5,8] | 5.20[4] | | | 5.20[1,5] | 5.20[3] | 5.20[3] | | 5.20[3] | | | 5.40[12] |
| **PLATE** Carbon steel | 3.50[1,5] | 3.50[1] | 3.50[1,5,8] | 3.50[4] | | | 3.50[1,13] | | 3.50[3] | 3.75[26] | 3.50[3] | 3.50[3] | | 3.75[12] |
| Floor Plates | 4.55[1] | 4.55 | 4.55[3] | 4.55[5] | | | | | | 4.55[26] | | | | |
| Alloy | 4.40[1] | 4.40[1] | 4.40[1] | | | | 4.40[13] | | | 4.55[26] | 4.40 | 4.40[3] | | |
| Hi Str. low alloy | 5.35[1,5] | 5.35[1] | 5.35[1,3] | 5.35[4,5] | | | 5.35[5] | | | 5.35[26] | 5.35[3] | 5.35[3] | | 5.60[12] |
| **SHAPES, Structural** | 3.40[1,5,9] | 3.40[1,23] | 3.40[1,5,8] | | | | | 3.45[3] | 3.45[3] | | 3.45[3] | | | |
| Hi Str. low alloy | 5.15[1,5] | 5.15[1] | 5.15[1,5,8] | | | | 5.15[5] | 5.20[3] | 5.20[3] | | 5.20[3] | | | |
| **MANUFACTURERS' WIRE** Bright | 4.50[2,5,18] | 4.50[2,4,12,33,34] | | 4.50[2,77] | | | 4.50[5] | Kokomo=4.60[30] | | | 4.50[3] | 4.60[3] | Duluth=4.80 Pueblo=4.75[14] | |
| **PILING, Steel Sheet** | 4.20[1,9] | 4.20[1] | | | | | | | 4.20[3] | | | | | |



UNIVERSITY OF MICHIGAN LIBRARIES

# STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

| Kansas City | Houston | Birmingham | WEST COAST Seattle, San Francisco, Los Angeles, Fontana | | |
|---|---|---|---|---|---|
| | | | F=$76.00 | | INGOTS Carbon forging, net ton |
| | $89.00[83] | | F=$77.00 | | Alloy, net ton |
| | | $53.00[11] | F=$72.00[19] | | BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton |
| | $71.00[83] | $63.00[11] | F=$82.00[19] | Geneva=$63.00[16] | Carbon forging billets, net ton |
| | $74.00[83] | | F=$85.00[19] | | Alloy net ton |
| | | | | | PIPE SKELP |
| | 4.25[83] | 3.85[11] | SF=4.50[24] LA=4.65[24,62] | Portsmouth=3.85[20] Worcester=4.15[2] | WIRE RODS |
| | | 3.35[4,11] | SF, LA=4.05[24] F=4.25[19] | Ashland=3.35‡; Niles=3.50[64], Geneva=3.45[16] | SHEETS Hot-rolled (18 ga. & hvr.) |
| | | 4.10[11] | SF=5.05[24] F=5.00[19] | | Cold-rolled |
| | | 4.40[4,11] | SF, LA=5.15[24] | Ashland=4.40[7] Kokomo=4.50[39] | Galvanized (10 gage) |
| | | | | | Enameling (12 gage) |
| | | | | | Long ternes (10 gage) |
| | | 5.05[11] | F=6.74[19] | | Hi Str. low alloy, h.r. |
| | | | F=7.05[19] | | Hi Str. low alloy, c.r. |
| | | | | | Hi Str. low alloy, galv. |
| 3.85[83] | 3.65[83] | 3.25[11] | SF, LA=4.00[24,62] F=4.40[19], S=4.25[62] | Ashland=3.25[7] Atlanta=3.40[68] | STRIP Hot-rolled |
| | | | F=5.75[19] LA=5.85[27] | New Haven=4.65[3], 5.00[58] Trenton=5.00[85] | Cold-rolled |
| | | 4.95[11] | F=6.64[19] | | Hi Str. low alloy, h. r. |
| | | | F=6.95[19] | | Hi Str. low alloy, c. r. |
| | | 7.60[11] | SF=8.25[24] | | TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢ |
| Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price | | | | | Electrolytic 0.25, 0.50, 0.75 lb box |
| | | | | | BLACKPLATE, 29 gage Hollowware enameling |
| 4.05[83] | 3.85[83] | 3.45[4,11] | SF, LA=4.15[24] LA=4.15[62] | Atlanta=3.60[68] | BARS Carbon steel |
| 4.05[83] | 3.85[83] | 3.45[4,11] | SF, S=4.20[62] F=4.10[19] | Atlanta=3.60[68] | Reinforcing‡ |
| | | | | Putnam, Newark=4.55[69] | Cold-finished |
| 4.55[83] | 4.35[83] | | LA=5.00[62] F=4.95[19] | | Alloy, hot-rolled |
| | | | | Newark,[69], Worcester[2]=5.20 Hartford=5.20[4] | Alloy, cold-drawn |
| | | 5.20[11] | F=6.25[19] | | Hi Str. low alloy, h.r. |
| | 3.90[83] | 3.50[4,11] | F=4.10[19] S=4.40[62] Geneva=3.50[16] | Claymont=3.90[29] Coatesville=3.90[21] Harrisburg=4.25[38] | PLATE Carbon steel |
| | | | | Harrisburg=5.25[38] | Floor plates |
| | | | F=5.40[19] | Coatesville=4.80[21] | Alloy |
| | | 5.35[11] | F=5.95[19] | Geneva=5.35[16] | Hi Str. low alloy |
| 4.00[83] | 3.80[83] | 3.40[11] | SF=3.95[62] LA=4.00[24,62] | Phoenixville=4.25[56] Geneva=3.40[16] | SHAPES, Structural |
| | | 5.15[11] | F=4.00[19] S=4.05[62] | Fontana=5.75[19] Geneva=5.15[16] | Hi Str. low alloy |
| 5.10[83] | 4.90[83] | 4.50[4,11] | SF, LA=5.45[24,62] | Portsmouth=4.50[20] Worcester=4.80[2] | MANUFACTURERS' WIRE Bright |

Notes: †Special coated mfg ternes deduct $1.15 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

## KEY TO STEEL PRODUCERS

### With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 John A. Roebling's Sons Co., Trenton, N. J.

## STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

| Product | 301 | 302 | 303 | 304 | 316 | 321 | 347 | 410 | 416 | 430 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ingots, rerolling | 13.75 | 14.50 | 16.00 | 15.50 | 23.75 | 19.25 | 21.00 | 12.25 | 14.25 | 12.50 |
| Slabs, billets, rerolling | 18.00 | 19.25 | 21.25 | 20.25 | 31.25 | 25.50 | 27.75 | 16.60 | 19.50 | 16.25 |
| Forg. discs, die blocks, rings | 32.00 | 32.00 | 34.50 | 33.50 | 50.50 | 38.00 | 42.50 | 26.00 | 26.50 | 26.50 |
| Billets, forging | 25.75 | 25.75 | 27.75 | 27.00 | 40.50 | 30.50 | 34.25 | 21.00 | 21.50 | 21.50 |
| Bars, wire, structurals | 30.00 | 30.00 | 32.50 | 31.50 | 47.50 | 35.50 | 40.00 | 24.50 | 25.00 | 25.00 |
| Plates | 32.00 | 32.00 | 34.00 | 34.00 | 50.50 | 39.50 | 44.00 | 26.00 | 26.50-27.00 | 26.50 |
| Sheets | 39.00 | 39.00 | 41.00 | 41.00 | 54.50 | 47.00 | 51.50 | 34.50 | 35.00 | 37.00 |
| Strip, hot-rolled | 25.50 | 27.00 | 31.25 | 29.00 | 47.25 | 35.75 | 40.00 | 22.50 | 29.25 | 23.00 |
| Strip, cold-rolled | 32.00 | 34.50 | 38.00 | 36.50 | 56.50 | 46.00 | 50.00 | 28.50 | 35.00 | 29.00 |

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38,39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

*Strip:* Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

*Bars:* Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

*Wire:* Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

*Structurals:* Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

*Plates:* Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

*Forged discs, die blocks, rings:* Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

*Forging billets:* Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

## ELECTRICAL SHEETS

*22 gage, HR cut lengths, f.o.b. mill*

| | Cents per lb. |
|---|---|
| Armature | 6.20 |
| Electrical | 6.70 |
| Motor | *7.95 |
| Dynamo | 8.75 |
| Transformer 72 | 9.30 |
| Transformer 65 | 9.85 |
| Transformer 58 | 10.55 |
| Transformer 52 | 11.35 |

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

## MERCHANT WIRE PRODUCTS

| To dealers, f.o.b. mill | Base Column | Pittsburg, Calif. |
|---|---|---|
| Standard & coated nails* | 106 | 125§ |
| Woven wire fence† | 116 | 139 |
| Fence posts, carloads†† | 116 | ... |
| Single loop bale ties | 113 | 137 |
| Galvanized barbed wire** | 126 | 146 |
| Twisted barbless wire | 126 | 146 |

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

| | Base per 100 lb | Pittsburg, Calif. |
|---|---|---|
| Merch. wire annealed‡ | $5.35 | $6.30 |
| Merch. wire, galv.‡ | 5.60 | 6.55 |
| Cut nails, carloads‡‡ | 6.75 | ... |

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa., (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only). 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

*Fence Posts:* Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

*Cut nails:* Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

## RAILS, TRACK SUPPLIES

| | F.o.b. mill |
|---|---|
| Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb | $3.40 |
| Joint bars, per 100 lb | 4.40 |
| Light rails, per 100 lb | 3.75 |

| | Base Price cents per lb |
|---|---|
| Track spikes† | 5.60 |
| Axles | 5.25 |
| Screw spikes | 8.60 |
| Tie plates | 4.20 |
| Pittsburg, Torr., Calif.; Seattle | 4.35 |
| Track bolts, untreated | 8.85 |
| Track bolts, heat treated, to railroads | 9.10 |

†Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

*Light rails:* All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

*Joint bars:* Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

*Track spikes:* Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

*Track bolts:* Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

*Axles:* Indiana Harbor, Ind., 79; Johnstown, Pa., 3.

*Tie plates:* Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minneona, Colo., 14.

**Numbers after producing points correspond to steel producers. See key on Steel Price page.**

## PIPE AND TUBING

*Base discounts, f.o.b. mills*
*Base price about $200.00 per net ton*

### Standard, T & C

| Steel, Buttweld* | Black | Galv |
|---|---|---|
| ½-in. | 40½ to 38½ | 21 to 19 |
| ¾-in. | 43½ to 41½ | 25 to 23 |
| 1-in. | 46 to 44 | 28 to 26 |
| 1¼-in. | 46½ to 44½ | 28½ to 26½ |
| 1½-in. | 47 to 45 | 29 to 27 |
| 2-in. | 47½ to 45½ | 29½ to 27½ |
| 2½ to 3-in. | 48 to 46 | 30 to 28 |
| **Steel, lapweld** | | |
| 2-in. | 38 | 19½ |
| 2½ to 3-in. | 42 | 23½ |
| 3½ to 6-in. | 43 to 40 | 24½ to 21½ |
| **Steel, seamless** | | |
| 2-in. | 36 | 17½ |
| 2½ to 3-in. | 39 | 20½ |
| 3½ to 6-in. | 41 | 22½ |
| **Wrought iron, buttweld** | | |
| ⅛-in. | +26½ | +56 |
| ¾-in. | +16½ | +45 |
| 1 & 1¼-in. | +10½ | +36 |
| 1½-in. | + 4½ | +32½ |
| 2-in. | + 4 | +32 |
| **Wrought iron, lapweld** | | |
| 2-in. | +13½ | +40 |
| 2½ to 3½-in. | +11 | +35½ |
| 4-in. | + 6 | +29½ |
| 4½ to 8-in. | + 8 | +31 |
| 9 to 12-in. | +18 | +40½ |

### Extra Strong, Plain Ends

| Steel, buttweld | | |
|---|---|---|
| ½-in. | 39½ to 37½ | 21½ to 19½ |
| ¾-in | 43½ to 41½ | 25½ to 23½ |
| 1-in. | 45½ to 43½ | 28½ to 26½ |
| 1¼-in. | 46 to 44 | 29 to 27 |
| 1½-in. | 46½ to 44½ | 29½ to 27½ |
| 2-in. | 47 to 45 | 30 to 29 |
| 2½ to 3-in. | 47½ to 45½ | 30½ to 28½ |
| **Steel, lapweld** | | |
| 2-in. | 37 | 19½ |
| 2½ to 3-in. | 42 | 24½ |
| 3½ to 6-in. | 44½ to 41½ | 27 to 24 |
| **Steel, seamless** | | |
| 2-in. | 35 | 17½ |
| 2½ to 3-in. | 38 | 21½ |
| 3½ to 6-in. | 42½ | 25 |
| **Wrought iron, buttweld** | | |
| ⅛-in. | +22 | +50 |
| ¾-in. | +15½ | +43 |
| 1 to 2 in. | + 5½ | +32 |
| **Wrought iron, lapweld** | | |
| 2-in. | +10½ | +36½ |
| 2½ to 4-in. | + 1 | +25 |
| 4½ to 6-in. | + 5 | +29½ |
| 7 & 8-in. | list | +24½ |
| 9 to 12-in. | +11½ | +32½ |

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld lapweld steel pipe, jobbers are granted a discount of 5 pct.
* Fontana, Calif., deduct 11 points from figures in left columns.

## BOILER TUBES

*Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.*

| OD in. | gage BWG | Seamless H.R. | Seamless C.R. | Electric Weld H.R. | Electric Weld C.D. |
|---|---|---|---|---|---|
| 2 | 13 | $20.61 | $24.24 | $19.99 | 23.51 |
| 2½ | 12 | 27.71 | 32.58 | 26.88 | 31.60 |
| 3 | 12 | 30.82 | 36.27 | 29.90 | 35.18 |
| 3½ | 11 | 38.52 | 45.38 | 37.36 | 43.99 |
| 4 | 10 | 47.82 | 56.25 | 46.39 | 54.56 |

## WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢).

| CITIES | SHEETS | | | STRIP | | PLATES | SHAPES | BARS | | ALLOY BARS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hot-Rolled | Cold-Rolled (18 gage) | Galvanized (10 gage) | Hot-Rolled | Cold-Rolled | | Standard Structural | Hot-Rolled | Cold-Finished | Hot-Rolled, A 4615 As-rolled | Hot-Rolled, A 4140 Ann. | Cold-Drawn, A 4615 As-rolled | Cold-Drawn, A 4140 Ann. |
| Baltimore | 5.15 | 6.39[1] | 6.55[1] 6.65 | 5.59–5.59[11] | .... | 5.40–6.04[11] | 5.69 | 5.59 | 6.19 | 9.69 | 9.99 | 11.12 | 11.49 |
| Birmingham* | 5.15[10] | 5.95 | 6.15[7] | 5.10 | .... | 5.40 | 5.25 | 5.10 | 6.88 | .... | .... | .... | .... |
| Boston | 5.75 | 6.55[10] | 6.94[8] 7.14 | 5.70 | 6.90–6.95 | 6.08 | 5.75 | 5.60 | 6.19–6.09 | 9.70–9.97 | 8.50–10.00 | 11.15 | 11.45 |
| Buffalo | 5.15 | 5.95 | 6.94 | 5.41 | 7.27 | 5.65 | 5.35 | 5.15 | 5.75 | 9.60 | 9.90 | 11.05 | 11.35 |
| Chicago | 5.15 | 6.20 | 6.85 | 5.10 | 6.30 | 5.40 | 5.25 | 5.10 | 5.65 | 9.25 | 9.55 | 10.70 | 11.00 |
| Cincinnati* | 5.42–5.97 | 5.99–6.24 | 6.39 | 5.35 | .... | 5.79 | 5.64 | 5.35–5.54 | 5.96–6.25 | 9.60–9.81 | 9.90–10.11 | 11.05–11.26 | 11.35–11.56 |
| Cleveland | 5.15 | 5.95 | 7.00–7.10 | 5.24 | 6.35 | 5.52 | 5.37 | 5.12 | 5.75 | 9.36 | 9.66 | 10.81 | 11.11 |
| Detroit | 5.33 | 6.09–6.33 | 7.09 | 5.49 | 6.43–6.80 | 5.59–5.79 | 5.64–5.68 | 5.39 | 5.91 | 9.56 | 9.86 | 11.01 | 11.31 |
| Houston | 6.00 | .... | .... | 6.10 | .... | 6.00 | 5.95 | 6.10 | 7.80 | 10.35–10.45 | 10.50–10.60 | 11.80 | 11.95–12.10 |
| Indianapolis | .... | .... | .... | .... | 7.36 | .... | .... | .... | 6.15 | .... | .... | .... | .... |
| Kansas City | 5.75 | 6.55 | 7.45 | 5.70 | 6.95 | 6.00 | 5.85 | 5.70 | 6.35 | 9.85 | 10.15 | 11.30 | 11.60 |
| Los Angeles | 5.90 | 7.45 | 8.00[2] | 5.95 | 8.70[15] | 6.00 | 5.90 | 5.90 | 7.55 | 10.75 | 10.75 | 12.45 | 12.75 |
| Memphis | 5.93 | 6.68 | .... | 5.98 | 6.80–8.51 | 6.08 | 5.93 | 5.68 | 6.51 | .... | .... | .... | .... |
| Milwaukee | 5.29 | 6.09 | 6.94–6.99 | 5.24 | 6.32 | 5.54 | 5.39 | 5.24 | 5.89 | 9.39 | 9.69 | 10.84 | 11.14 |
| New Orleans* | 5.50[1] | 6.75 | .... | 5.55[1] | 6.80 | 5.65 | 5.55[1] | 5.55[1] | 6.75 | .... | .... | .... | .... |
| New York | 5.55 | 6.85[1] 6.89[1] | 7.20[2] | 5.84 | 6.90[1] 6.78 | 5.90 | 5.65 | 5.75 | 6.80 6.44 | 9.60 | 9.90 | 11.05 | 11.35 |
| Norfolk | 6.10[13] | 7.00 | .... | 6.30[13] | .... | 6.15[13] | 6.20[13] | 6.15[13] | 7.20[13] | .... | .... | .... | .... |
| Philadelphia* | 6.05 | 6.35 6.45 | 6.80 6.85[2] | 5.65 | 6.29 | 5.65 | 5.45 | 5.60 | 6.21 | 9.35 | 9.65 | 10.80 | 11.10 |
| Pittsburgh | 5.15 | 5.95 | 6.60 | 5.20 | 5.95–6.00 | 5.35 | 5.25 | 5.10 | 5.75 | 9.25 | 9.55 | 10.70 | 11.00 |
| Portland | 6.60–7.10[1] | 8.40[2] | .... | 6.85[9] | .... | 6.40[9] | 6.50 | 6.45–6.45[9] | 8.60[14] | 12.00[18] | 11.60[18] | .... | .... |
| Salt Lake City | 5.85 | 6.70 | .... | 7.45 | 8.75 | 6.10[3] | 5.90 | 7.35[9] | 8.75 | .... | .... | .... | .... |
| San Francisco* | 6.20 | 7.60[2] | 7.65[2] | 6.15 | 7.85[16] | 6.10 | 6.00 | 6.00 | 7.55 | 10.75 | 10.75 | 12.45 | 12.75 |
| Seattle | 6.60[4] | 8.15[2] | 8.40[2] | 6.85[4] | .... | 6.35[4] | 6.20[4] | 6.35[4] | 8.50[14] | .... | 11.60[18] | .... | 13.60[18] |
| St. Louis | 5.48 | 6.28 | 7.18 | 5.43 | 6.68–7.54 | 5.73 | 5.58 | 5.43 | 6.08 | 9.58 | 9.88 | 11.03 | 11.33 |
| St. Paul* | 5.71 | 6.51 | 7.41 | 5.66 | 6.19–6.82 | 5.96 | 5.81 | 5.66 | 6.31 | 9.81 | 10.11 | 11.28 | 11.58 |

**BASE QUANTITIES:** *(Standard unless otherwise keyed on prices.)* Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

**Exceptions:**
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

## PIG IRON PRICES

*Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.*

PRODUCING POINT PRICES

| Producing Point | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|
| Bethlehem | 48.00 | 48.50 | 49.00 | 49.50 | ..... |
| Birmingham | 41.88 | 42.38 | ..... | ..... | ..... |
| Buffalo | 46.00 | 46.50 | 47.00 | ..... | ..... |
| Chicago | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Cleveland | 46.00 | 46.50 | 46.50 | 47.00 | 51.00 |
| Daingerfield, Tex. | 41.50 | 42.00 | 42.00 | ..... | ..... |
| Duluth | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Erie | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Everett | ..... | 50.50 | 51.00 | ..... | ..... |
| Granite City | 47.90 | 48.40 | 48.90 | ..... | ..... |
| Ironton, Utah | 46.00 | 46.50 | ..... | ..... | ..... |
| Pittsburgh | 46.00–51.00 | 46.50–49.50 | 46.50–49.50 | 47.00–50.00 | ..... |
| Geneva, Utah | 46.00 | 46.50 | ..... | ..... | ..... |
| Sharpsville | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Steelton | 48.00 | 48.50 | 49.00 | 49.50 | 54.00 |
| Struthers, Ohio | 46.00 | ..... | ..... | ..... | ..... |
| Swedeland | 50.00 | 50.50 | 51.00 | 51.50 | ..... |
| Toledo | 46.00 | 46.50 | 46.50 | 47.00 | ..... |
| Troy, N. Y. | 48.00 | 48.50 | 49.00 | ..... | 54.00 |
| Youngstown | 46.00 | 46.50 | 46.50 | 47.00 | ..... |

DELIVERED PRICES (BASE GRADES)

| Consuming Point | Producing Point | Rail Freight Rate | Basic | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
|---|---|---|---|---|---|---|---|
| Boston | Everett | $0.50 Arb. | ..... | 50.50 | 51.00 | ..... | ..... |
| Boston | Steelton | 6.90 | ..... | ..... | ..... | ..... | 60.90 |
| Brooklyn | Bethlehem | 4.29 | ..... | 52.79 | 53.29 | 53.79 | ..... |
| Cincinnati | Birmingham | 6.70 | 48.58 | 49.08 | ..... | ..... | ..... |
| Jersey City | Bethlehem | 2.63 | ..... | 51.13 | 51.63 | 52.13 | ..... |
| Los Angeles | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| Mansfield | Cleveland-Toledo | 3.33 | 49.33 | 49.83 | 49.83 | 50.33 | 54.33 |
| Philadelphia | Bethlehem | 2.39 | 50.39 | 50.89 | 51.39 | 51.89 | ..... |
| Philadelphia | Swedeland | 1.44 | 51.44 | 51.94 | 52.44 | 52.94 | ..... |
| Philadelphia | Steelton | 3.09 | 51.09 | 51.59 | 52.09 | 52.59 | 57.09 |
| Rochester | Buffalo | 2.63 | 48.63 | 49.13 | 49.63 | ..... | ..... |
| San Francisco | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| Seattle | Geneva-Ironton | 7.70 | 53.70 | 54.20 | ..... | ..... | ..... |
| St. Louis | Granite City | 0.75 Arb. | 48.65 | 49.15 | 49.65 | ..... | ..... |
| Syracuse | Buffalo | 3.58 | 49.58 | 50.08 | 50.58 | ..... | ..... |

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

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## BOLTS, NUTS, RIVETS, SET SCREWS

### Consumer Prices

*(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago) Base discount*

**Machine and Carriage Bolts**

| | Pct Off List Less Case | C. |
|---|---|---|
| ½ in. & smaller x 6 in. & shorter | 27 | 38 |
| 9/16 & ⅝ in. x 6 in. & shorter | 29 | 40 |
| ¾ in. & larger x 6 in. & shorter | 26 | 37 |
| All diam, longer than 6 in. | 22 | 34 |
| Lag, all diam, longer than 6 in. | 28 | 39 |
| Lag, all diam x 6 in. & shorter | 30 | 41 |
| Plow bolts | 40 | — |

**Nuts, Cold Punched or Hot Pressed**

*(Hexagons or Square)*

| | | |
|---|---|---|
| ½ in. and smaller | 25 | 37 |
| 9/16 to ⅝ in. | 23 | 35 |
| ¾ to 1½ in. inclusive | 23 | 35 |
| 1⅝ in. and larger | 16 | 29 |

**Semifinished Hexagon Nuts**

*(Less case lots)*

| | Pct Off List Reg | Hvy | Lt |
|---|---|---|---|
| ½ in. and smaller | 41 | 35 | 41 |
| 9/16 to ⅝ in. | 36 | 30 | 36 |
| ¾ to 1½ in. | 31 | 27 | 33 |
| 1⅝ in. and larger | 21 | 17 | .. |

In full case lots, 15 pct additional discount.

**Stove Bolts**

| | Pct Off List |
|---|---|
| Packaged, steel, plain finish | 63 |
| Packaged, plated finish | 50 |
| Bulk, plain finish** | 69* |

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

**Large Rivets**

*(½ in. and larger) Base per 100 lb*

| | |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. | $7.25 |

**Small Rivets**

*(7/16 in. and smaller) Pct Off List*

| | |
|---|---|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham | 43 |

**Cap and Set Screws**

| *(In bulk)* | Pct Off List |
|---|---|
| Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright | 60 |
| ¼ in. through ⅝ in. x 6 in. and shorter high C heat treated | 54 |
| Milled studs | 23 |
| Flat head cap screws, listed sizes | 24 |
| Fillister head cap, listed sizes | 43 |
| Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter | 59 |

## C-R SPRING STEEL

*Base per pound f.o.b. mill*

| | |
|---|---|
| 0.26 to 0.40 carbon | 4.50¢ |
| 0.41 to 0.60 carbon | 5.95¢ |
| 0.61 to 0.80 carbon | 6.55¢ |
| 0.81 to 1.05 carbon | 8.50¢ |
| 1.06 to 1.35 carbon | 10.80¢ |

Worcester, add 0.30¢.

## LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)

| | Per gross ton |
|---|---|
| Old range, bessemer | $8.10 |
| Old range, nonbessemer | 7.95 |
| Mesabi, bessemer | 7.85 |
| Mesabi, nonbessemer | 7.70 |
| High phosphorus | 7.70 |

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

## ELECTRODES

*Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed*

| Diam. in in. | Length in in. | Cents Per lb |
|---|---|---|
| | GRAPHITE | |
| 17, 18, 20 | 60, 72 | 17.00¢ |
| 8 to 16 | 48, 60, 72 | 17.00¢ |
| 7 | 48, 60 | 18.64¢ |
| 6 | 48, 60 | 19.95¢ |
| 4, 5 | 40 | 20.48¢ |
| 3 | 40 | 21.53¢ |
| 2½ | 24, 30 | 22.05¢ |
| 2 | 24, 30 | 24.15¢ |
| | CARBON | |
| 40 | 100, 110 | 7.65¢ |
| 35 | 65, 110 | 7.65¢ |
| 30 | 65, 84, 110 | 7.65¢ |
| 24 | 72 to 104 | 7.65¢ |
| 20 | 84, 90 | 7.65¢ |
| 17 | 60, 72 | 7.65¢ |
| 14 | 60, 72 | 8.16¢ |
| 10, 12 | 60 | 8.42¢ |
| 8 | 60 | 8.67¢ |

## CLAD STEEL

*Base prices, cents per pound, f.o.b. mill*

| Stainless-carbon | Plate | Sheet |
|---|---|---|
| No. 304, 20 pct, Coatesville, Pa. (21) | *28.00 | |
| Washgtn, Pa. (39) | *26.50 | |
| Claymont, Del. (29) | *26.50 | |
| Conshohocken, Pa. (26) | | *24.00 |
| New Castle, Ind. (55) | *26.50 | *25.50 |
| Nickel-carbon 10 pct, Coatesville (21) | 31.00 | |
| Inconel-carbon 10 pct, Coatesville (21) | 39.00 | |
| Monel-carbon 10 pct, Coatesville (21) | 32.00 | |
| No. 302 Stainless-copper-stainless, Carnegie, Pa. (60) | | 75.00 |
| Aluminized steel sheets, hot dip, Butler, Pa. (7) | | 7.75 |

* Includes annealing and pickling, or sandblasting.

## TOOL STEEL

*F.o.b. mill*

| W | Cr | V | Mo | Co | Base per lb |
|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | $1.00 |
| 18 | 4 | 1 | — | 5 | $1.565 |
| 18 | 4 | 2 | — | — | $1.13 |
| 1.5 | 4 | 1.5 | 8 | — | 71.5¢ |
| 6 | 4 | 2 | 6 | — | 76.5¢ |

| | |
|---|---|
| High-carbon-chromium | 57.5¢ |
| Oil hardened manganese | 32¢ |
| Special carbon | 29.5¢ |
| Extra carbon | 24.5¢ |
| Regular carbon | 21¢ |

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

## COKE

| | Net Ton |
|---|---|
| Furnace, beehive (f.o.b. oven) Connellsville, Pa. | $14.00 to $14.50 |
| Foundry, beehive (f.o.b. oven) Connellsville, Pa. | $16.00 to $16.50 |
| Foundry, oven coke | |
| Buffalo, del'd | $24.00 |
| Chicago, f.o.b. | 21.00 |
| Detroit, f.o.b. | 20.40 |
| New England, del'd | 23.40 |
| Seaboard, N. J., f.o.b. | 22.00 |
| Philadelphia, f.o.b. | 21.25 |
| Swedeland, Pa., f.o.b. | 21.20 |
| Painesville, Ohio, f.o.b. | 21.90 |
| Erie, del'd | $21.04 to 21.25 |
| Cleveland, del'd | 22.62 |
| Cincinnati, del'd | 22.71 |
| St. Paul, f.o.b. | 21.00 |
| St. Louis, del'd | 22.18 |
| Birmingham, del'd | 20.20 |

## FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net; Effective CaF, content:

| | |
|---|---|
| 70% or more | $39.00 |
| 60% or less | 36.00 |

## REFRACTORIES

| Fire Clay Brick | (F.o.b. works) Carloads, Per 1000 |
|---|---|
| First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) | $86.00 |
| No. 1 Ohio | 80.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 80.00 |
| No. 2 Ohio | 72.00 |
| Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) | 14.00 |

**Silica Brick**

| | |
|---|---|
| Mt. Union, Pa., Ensley, Ala. | $86.00 |
| Childs, Pa. | 90.00 |
| Hays, Pa. | 91.00 |
| Chicago District | 95.00 |
| Western Utah and Calif. | 101.00 |
| Super Duty, Hays, Pa., Athens, Tex., Chicago | 106.00 |
| Silica cement, net ton, bulk, Eastern (except Hays, Pa.) | 15.00 |
| Silica cement, net ton, bulk, Hays, Pa. | 17.00 |
| Silica cement, net ton, bulk, Ensley, Ala. | 16.00 |
| Silica cement, net ton, bulk, Chicago District | 16.00 |
| Silica cement, net ton, bulk, Utah and Calif. | 22.50 |

| Chrome Brick | Per Net Ton |
|---|---|
| Standard chemically bonded, Balt., Chester | $72.00 |

**Magnesite Brick**

| | |
|---|---|
| Standard, Baltimore | $94.00 |
| Chemically bonded, Baltimore | 83.00 |

| Grain Magnesite | St. ⅜-in. grains |
|---|---|
| Domestic, f.o.b. Baltimore, in bulk fines removed | $56.00 to $57.00 |
| Domestic, f.o.b. Chewelah, Wash., in bulk | 33.00 |
| in sacks | 38.00 |

**Dead Burned Dolomite**

| | |
|---|---|
| F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ | $13.00 |

## METAL POWDERS

*Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.*

| | |
|---|---|
| Swedish sponge iron c.l.f. New York, ocean bags | 7.4¢ to 9.0¢ |
| Canadian sponge iron, del'd, in East | 10.00¢ |
| Domestic sponge iron, 98+% Fe, carload lots | 9.0¢ to 15.0¢ |
| Electrolytic iron, annealed, 99.5+% Fe | 36.0¢ to 39.5¢ |
| Electrolytic iron upannealed, minus 325 mesh, 99+% Fe | 48.5¢ |
| Hydrogen reduced iron, minus 300 mesh, 98+% Fe | 63.0¢ to 80.0¢ |
| Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe | 70.0¢ to $1.35 |
| Aluminum | 29.00¢ |
| Brass, 10 ton lots | 27.75¢ to 31.25¢ |
| Copper, electrolytic | 9.25¢ plus metal value |
| Copper, reduced | 9.75¢ plus metal value |
| Cadmium, 100-199 lb | $2.95 |
| Chromium, electrolytic, 99% min., and quantity | $3.50 |
| Lead | 6.5¢ plus metal value |
| Manganese | 52.00¢ |
| Molybdenum, 99% | $2.65 |
| Nickel, unannealed | 75.5¢ |
| Nickel, annealed | 81.5¢ |
| Nickel, spherical, unannealed | 78.5¢ |
| Silicon | 34.00¢ |
| Solder powder | 6.5¢ to 8.5¢ plus met. value |
| Stainless steel, 302 | 75.00¢ |
| Tin | 11.00¢ plus metal value |
| Tungsten, 99% | $2.90 |
| Zinc, 10 ton lots | 20.50¢ to 23.85¢ |

## CAST IRON WATER PIPE

*Per net ton*

| | |
|---|---|
| 6 to 24-in., del'd Chicago | $91.80 to $95.30 |
| 6 to 24-in., del'd N. Y. | 91.00 to 92.00 |
| 6 to 24-in., Birmingham | 78.00 to 82.50 |
| 6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less | $108.50 to $113.00 |

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

*Continued*

## FERROALLOYS

### Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

| | |
|---|---|
| F.o.b. Birmingham | $174 |
| F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont. | $172 |
| F.o.b. Johnstown, Pa. | $174 |
| F.o.b. Sheridan, Pa. | $172 |
| F.o.b. Etna, Clairton, Pa. | $175 |

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

| | |
|---|---|
| Carload, bulk | 10.45 |
| Ton lots | 12.05 |

### Spiegeleisen

Contract prices gross ton, lump, f.o.b.

| | 16-19% Mn 3% max. Si | 19-21% Mn 3% max. Si |
|---|---|---|
| Palmerton, Pa. | $64.00 | $65.00 |
| Pgh. or Chicago | 65.00 | 66.00 |

### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

| | |
|---|---|
| Carload, packed | 35.5 |
| Ton lots | 37.0 |

### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

| | |
|---|---|
| Carloads | 28 |
| Ton lots | 30 |
| Less ton lots | 32 |

### Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 18.15¢

### Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

| | Carloads | Ton | Less |
|---|---|---|---|
| 0.07% max. C, 0.06% P, 90% Mn | 25.25 | 27.10 | 28.30 |
| 0.10% max. C | 24.75 | 26.60 | 27.80 |
| 0.15% max. C | 24.25 | 26.10 | 27.30 |
| 0.30% max. C | 23.75 | 25.60 | 26.80 |
| 0.50% max. C | 23.25 | 25.10 | 26.30 |
| 0.75% max. C, 7.00% max. Si | 20.25 | 22.10 | 23.30 |

### Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered. 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

| | |
|---|---|
| Carload bulk | 8.95 |
| Ton lots | 10.60 |
| Briquet, contract basis carlots, bulk delivered, per lb of briquet | 10.30 |
| Ton lots | 11.90 |

### Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

| | |
|---|---|
| 96% Si, 2% Fe | 20.70 |
| 97% Si, 1% Fe | 21.10 |

### Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

| | |
|---|---|
| Carload, bulk | 6.30 |
| Ton lots | 7.90 |

### Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

| | | | |
|---|---|---|---|
| 25% Si | 17.00 | 75% Si | 13.50 |
| 50% Si | 11.30 | 85% Si | 14.65 |
| 90-95% Si | | | 16.50 |

### Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots | $2.05 | $2.95 | $3.75 |
| Less ton lots | 2.40 | 3.30 | 4.55 |

### Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

| | | | |
|---|---|---|---|
| 0.06% C | 28.75 | 0.20% C | 27.75 |
| 0.10% C | 28.25 | 0.50% C | 27.50 |
| 0.15% C | 28.00 | 1.00% C | 27.25 |
| 2.00% C | | | 27.00 |
| 65-69% Cr, 4-9% C | | | 20.50 |
| 62-66% Cr, 4-6% C, 6-9% Si | | | 21.35 |

### High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

### S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

| | |
|---|---|
| Carloads | 21.60 |
| Ton lots | 23.75 |
| Less ton lots | 25.25 |

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

| | |
|---|---|
| Carloads | 27.75 |
| Ton lots | 30.05 |
| Less ton lots | 31.85 |

### Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

| | |
|---|---|
| 0.20% Max. C. | $1.09 |
| 0.50% max. C | 1.05 |
| .00 min. C | 1.04 |

### Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

### Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

| | |
|---|---|
| Carloads | 17.90 |
| Ton lots | 21.00 |
| Less ton lots | 22.50 |

### Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

| | |
|---|---|
| Carloads | 19.25 |
| Ton lots | 21.55 |
| Less ton lots | 22.55 |

### CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

| | |
|---|---|
| Ton lots | 19.75 |
| Less ton lots | 21.00 |

### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

| | |
|---|---|
| Ton lots | 15.75¢ |
| Less ton lots | 17.00¢ |

### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

| | |
|---|---|
| Carload packed | 17.00¢ |
| Ton lots to carload packed | 18.00¢ |
| Less ton lots | 19.50¢ |

### SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

| | |
|---|---|
| Ton lots | 17.25 |
| Less ton lots | 18.50 |

### Other Ferroalloys

| | |
|---|---|
| Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y. | |
| Carload | 7.65¢ |
| Ton lots | 9.05¢ |
| Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo | 96¢ |
| Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb. | |
| Ton lots | $3.50 |
| Less ton lots | 3.55 |
| Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta | $2.67 |
| Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo | $1.13 |
| Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton | $65.00 |
| 10 tons to less carload | 75.00 |
| Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti | $1.28 |
| Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti | $1.40 |
| Less ton lots | $1.45 |
| Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton | $167.00 |
| Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered | $2.25 |
| Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V. | |
| Openhearth | $2.90 |
| Crucible | 3.00 |
| High speed steel (Primos) | 3.10 |
| Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. | 95¢ |
| bags, f.o.b. Washington, Pa., Langeloth, Pa. | 94¢ |
| Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound | |
| Carload, bulk, lump | 11.00¢ |
| Ton lots, bulk, lump | 11.50¢ |
| Less ton lots, lump | 12.25¢ |
| Vanadium pentoxide, 88-92% $V_2O_5$ contract basis, per pound contained $V_2O_5$ | $1.20 |
| Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. | |
| Ton lots | 21.00¢ |
| Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy. | |
| Carload, bulk | 6.60¢ |

### Boron Agents

Contract prices per lb of alloy, del.

| | |
|---|---|
| Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B | $4.25 |
| Bortam, f.o.b. Niagara Falls | |
| Ton lots, per pound | 45¢ |
| Less ton lots, per pound | 50¢ |
| Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed. | |
| Ton lots, per pound | 10.00¢ |
| Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots | $1.20 |
| F.o.b. Wash., Pa.; 100 lb, up | |
| 10 to 14% B | .75 |
| 14 to 19% B | 1.20 |
| 19% min. B | 1.50 |
| Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over. | |
| No. 1 | 93¢ |
| No. 6 | 63¢ |
| No. 79 | 45¢ |
| Manganese—Boron 75.00% Mn. 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered. | |
| Ton lots | $1.46 |
| Less ton lots | 1.57 |
| Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered. | |
| Less ton lots | $1.80 |
| Silcaz, contract basis, delivered. | |
| Ton lots | 45.00¢ |

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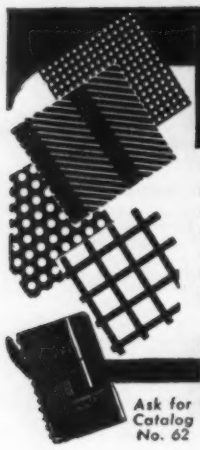

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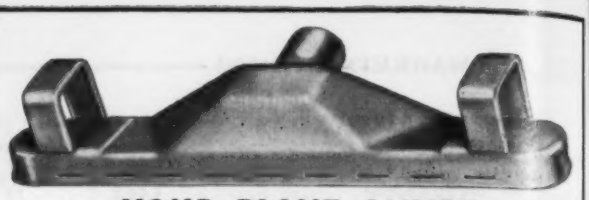

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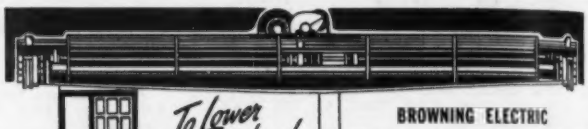

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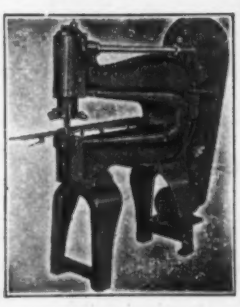

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# The Clearing House

**NEWS OF USED, REBUILT AND SURPLUS MACHINERY**

**Cleveland Demand** — The demand for used and rebuilt machine tools has picked up sharply here as a result of the impending volume of war work. Prices are firming up but dealers are still selling some machines at prices below current replacement costs. Recent increases in the prices of new machine tools and extended deliveries, some a year or longer, have prompted many companies to look for good used equipment. Machine tool companies offering rebuilding services are booked to capacity and are not soliciting additional business. This has brought additional customers to many used dealers.

**Washington, D. C., NISA**—Leon E. Hopkins of Carty Electric & Armature Works was recently elected president of the Washington, D. C., chapter of the National Industrial Service Assn. E. A. Bishop of Potomac Armature Service was elected secretary and J. W. Lainhart and John F. Warfield, both of Warfield & Sanford, were elected recording secretary and treasurer, respectively.

**NISA Guests** — The King Coal chapter of the National Industrial Service Assn. met recently in Madisonville, Ky. as guests of the Whitfield Electric Co. Discussions covered the wire situation and motor discounts.

**Who's Buying**—Most used and rebuilt machines are moving to the larger plants right now. However, it is expected that as the sub-contracts begin to be issued, smaller plants and shops will be in the used market in greater numbers. Auctions, plant liquidations and sales continue to draw large numbers of buyers, many buying for their own use. This complicates the dealer's job of picking up machines at a price level that will permit a profit.

While some of the Cleveland buying is for replacement rather than in anticipation of war contract work, availability of machines at prices permitting rebuilding is a particularly tough problem at the moment. Old machines are available in large numbers at soft prices. Items like cone driven machines are finding homes only in very small shops. It appears likely that much of this equipment will never move profitably again and will ultimately find its way to the scrap heap.

**Louisville NISA** — At a recent meeting of the Louisville chapter of the National Industrial Service Assn., the following were installed into office: Robert Campbell of Krauth - Campbell Electric Co., president; Edward Sharre of Clark Electric Sales & Service Co., vice-president; Owen W. Gollar, Jr., of Owen Gollar Electric Co., secretary; and E.M. Murphy of Marine Electric Co., treasurer.

**Dealer Expands**—A million dollar government built plant was purchased from the General Services Equipment Co., Rochester. The new factory has 95,000 sq ft of floor space and is situated near the Baltimore and Ohio Railroad.

Purpose of the purchase is to consolidate the company's activities which include warehouses in Rochester, Buffalo and Watertown, N. Y.; Canton, Ohio and Houston, Tex.

**Wisconsin NISA**—Recent elections at the Wisconsin chapter of the National Industrial Service Assn., Milwaukee, placed N. J. Koenig of Koenig Electric Co. in the position of president for the year 1950-1951. R. H. Trester of Trester Service Electric Co. was elected vice-president and Roy Schulz of Alfred Schulz & Son Electric Co. was elected treasurer. E. H. Herzberg of 808 N. Third St., Milwaukee, was elected executive secretary.

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